

MACMILLAN'S
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A GEOGRAPHY OF THE WORLD



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A GEOGRAPHY OF THE WORLD

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PREFACE

“When you can measure what you are speaking about and express it in numbers, you know something about it, but when you can not measure it, when you can not express it in numbers, your knowledge is of a meagre and unsatisfactory kind.”—*Lord Kelvin*.

AN ideal course in Geography would deal with the quantitative measurement and expression of the facts as to the geographical conditions under which man lives and works determined in relation to the world as a unit. This or that country produces or uses this or that proportion of a given commodity; it is not enough to know that Brazil produces coffee, or Australia mines gold; we must know that Brazil produces four-fifths of the world's coffee and Kalgoorlie mines one-tenth of the world's gold. This book is an attempt within many limitations to realise this ideal: it represents an endeavour to obtain in the realm of geographical facts a numerical statement of our knowledge.

The first limitation is due to size. It is scarcely possible to deal exhaustively with all the geographical facts of the world in a book of this compass; some selection has been necessary, and it appeared advisable to allow for greater detail in certain parts by limiting the scope to the British Empire as a sample of the whole world.

Superficially, it may appear that the data considered are too economic in character, that insufficient allowance has been made for the physiographic elements. This is, however, more an appearance than a reality; the numerical statement of the facts necessarily takes up more space than the verbal expression which is possible in regard to land forms.

Geography deals with the co-existence at the present time of the many forces which tend to shape human effort. It is, therefore,

immaterial whether we deal with the physiographic or climatic factor first; consequently this book develops the argument from rainfall to vegetation, etc., since these appear more intimately connected with man's work than the orographical facts.

It would perhaps have sufficed merely to give the quantitative results of the exhaustive search into "original sources" which the writer has been making for more than two years—but it is more educational for the pupil to be able to cull some facts for himself, and therefore the tabular statements have been included in addition to statements of the main conclusions to be drawn from them. It may be suggested that for a first reading the tables should be consulted only in order to verify the statements in the text, and that the second reading should be devoted to a revision of the text and to attempts to gather additional information from the numerical data.

It would not be worth while to work so long at such numerical data if they possessed no constancy—if it were true that statistical matter of this kind is untrustworthy because it soon gets out-of-date. But it can be shown that percentage values obtained from the tables contained in this book have been true within an error of 5 per cent. for very many years—the actual numbers change but the proportions are constant, and there is a great probability that in nearly all cases the proportions will remain unchanged for at least the next ten years. For this reason pupils should be encouraged to express their numerical results in simple fractions: within the error of 5 per cent. the fractions $\frac{1}{3}$ and $\frac{1}{5}$, or $\frac{2}{3}$ and $\frac{4}{5}$, are equally satisfactory. These simple statements are the facts which should be learnt, it is not suggested that there should be any attempt to memorise the quantities even in millions of lbs.

The examination questions have been taken from the world-wide sources which are indicated and should serve, with the summaries, as revision exercises.

Part I. and each of the sections in Part II. have been submitted to an expert who resides in the part of the British Empire with which the section deals. The Australian Section has been read by Mr. Charles R. Long, Inspector of Schools, Education Department, Victoria, and author of several educational works. The African Section has been read by well-known authorities in Cape Town and Cairo. The Section on Asia has been read by Mr. H. Arden

Wood, Principal of La Martinière College, Calcutta ; and the Section dealing with Canada by a geographer in Toronto. The author owes thanks to all these gentlemen for their care in reading the proof sheets referring to their respective sections, and for the suggestions and emendations which have helped to increase the accuracy and usefulness of the work.

Acknowledgment is gladly made to the General Editors, Prof. R. A. Gregory and Mr. A. T. Simmons, for many suggestions and continuous kindly guidance which have been of great assistance in a work that has been prosecuted without the help which would have been afforded by a previous attempt to work out the geographical facts of the world on similar lines.

The author is grateful to his colleagues, Miss S. M. Nicholls and Mr. T. Crockett, who have read parts of the proofs and have made many valuable suggestions.

Permission to reproduce Figs. 93, 94 and 95 from the valuable *Atlas of Meteorology* has been kindly granted by Messrs. John Bartholomew & Co., The Edinburgh Geographical Institute, and the photograph of the Victoria Falls (Fig. 52) has been used by permission from Prof. G. A. J. Cole, and that of the Frozen Waterfall (Fig. 68) by permission of the Royal Geographical Society.

EXAMINATION QUESTIONS

C.P.	College of Preceptors, London.	U.S.	University of Sydney.
L.C.C.	Lon. County Council	Man	Manitoba.
U.A.	University of Adelaide	Newf.	Newfoundland.
C.S.C.	Civil Service Com- mission, London.	N.S.W.	New South Wales.
C.U.L.	Cambridge University.	N.Z. Ed. D	New Zealand Educa- tion Department.
Auck. U.	Auckland University.	U.N.Z.	University of New Zealand.
U.M.	University of Mel- bourne.	Alb.	Alberta, Canada.
N. Scot.	Nova Scotia.	U. Mad.	University of Madras.
L.U.	University of London.	U. All.	University of Allaha- bad.
Br. Col.	British Columbia.	N.U.	Northern Universities, England.
P.E.I.	Prince Edward Island.	U. Pan.	Panjab University.
Ont	Ontario.	U.P.	United Provinces, India.
L.C. Com.	London Chamber of Commerce.	C.W.B.	Central Welsh Board.
S.A.	South Australia Educa- tion Department.	U. Cal.	University of Calcutta.
Eng. P.C.	Preliminary Certificate Examination, Eng- land.	Sask.	Saskatchewan, Canada.
O.U.L.	Oxford University Locals.	N.U.T.	National Union of Teachers, England.
M.U.	Manchester University.	L.C.U.	Lancashire and Che- shire Union.
B.U.	Birmingham Univer- sity.	Sc. Ed. Dept.	Scottish Education Department.

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PART I.

THE WORLD IN GENERAL.

1. The Continents and Oceans.

1. Examine Figs. 1 and 2, and compare them with a globe. Tabulate the names of the continents, oceans and oceanic seas which lie within the Land Hemisphere shown in Fig. 2.

The land masses. - There are six continents, of which five are inhabited. The smallest inhabited continent in the Northern Hemisphere is **Europe**. The **British Isles**, on the western edge of this continent, lie at the centre of the Land Hemisphere. Continuous with Europe is **Asia**, which extends at its south-eastern extension into the Water Hemisphere. Southwards from Europe and south-westwards from Asia is **Africa**, which reaches south to the edge of the Land Hemisphere. **North America** lies within the land half of the world, and **South America** has a small portion within the Water Hemisphere. **Australia** is the only inhabited continent entirely within the Water Hemisphere, and **Antarctica** - uninhabited - lies within the same half of the world to the south-east. **New Zealand** lies almost at the centre of the Water Hemisphere, which is at Antipodes Island.

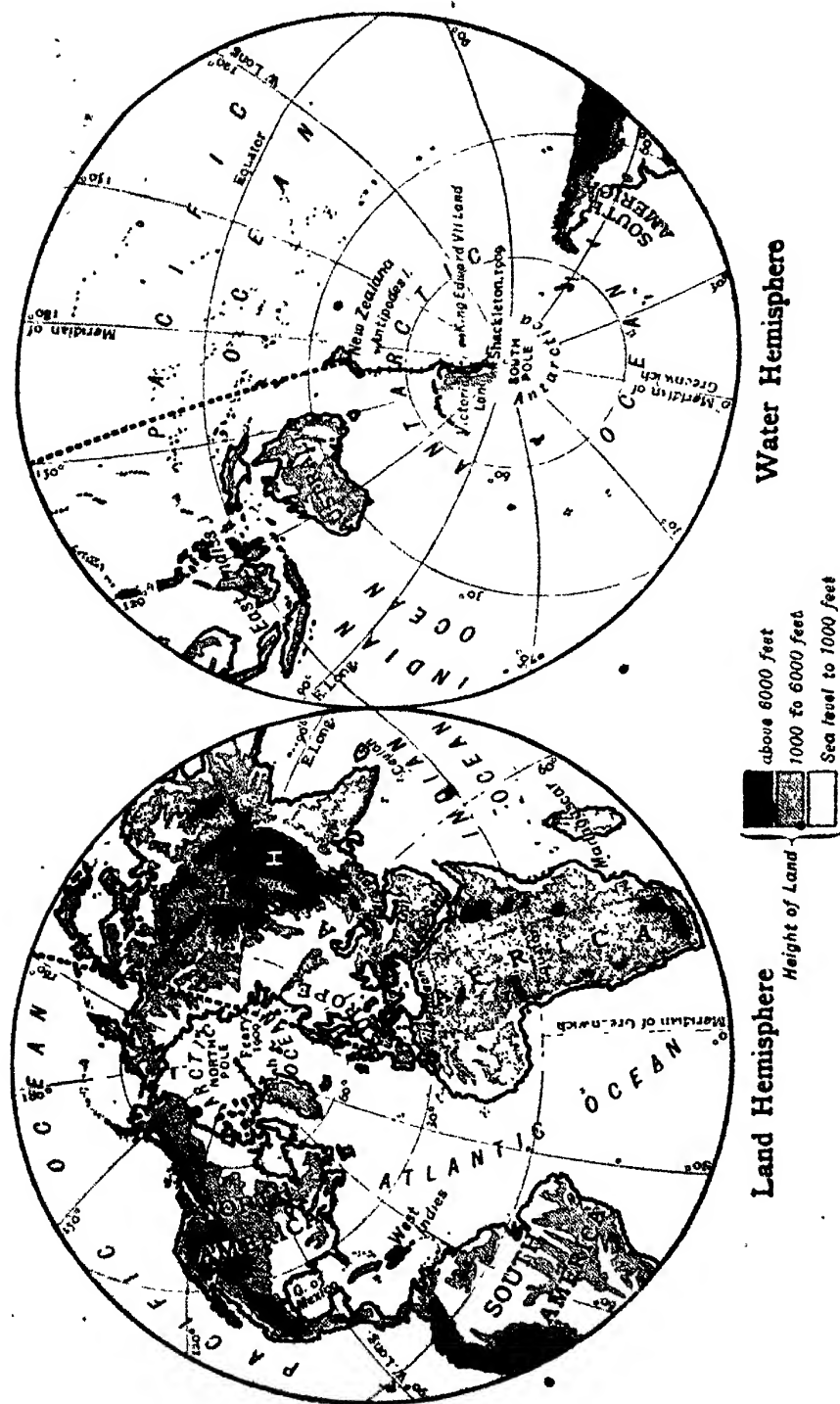
The oceans and seas. - Corresponding to the land of **North Africa** and **Eurasia** (Europe and Asia) in the land hemisphere is the Pacific Ocean in the Water Hemisphere. Roughly corresponding to Australia and the East Indies is the **North Atlantic Ocean**. The **Indian Ocean** is roughly opposed to South America. The **Arctic Ocean** is opposed to Antarctica.

These features are best seen in Fig. 2. The outliers of the Atlantic Ocean are shown in Fig. 1; they are the **Gulf of Mexico**

2



FIG. 1.—RELIEF MAP OF THE WORLD. (Mercator's Projection.)



Routes taken in Polar explorations shown thus: —
 Track of Great Circle from Greenwich to Wellington N.Z. shown thus: - - -
 Area of Sven Hedin's explorations shown thus: . . .

FIG. 2.—RELIEF MAP OF THE WORLD IN HEMISPHERES.

and the **Mediterranean Sea**. The outliers of the Indian Ocean are the **Red Sea** and the **Persian Gulf**.

The islands.—The main island groups are the **American Arctic Archipelago**, of which the largest island is **Greenland**; the **West Indies** in the Gulf of Mexico, the largest island being **Cuba**; the **East Indies**, the largest of which is **Borneo**; the Pacific groups of scattered islets.

In addition to these, **Madagascar**, and **Ceylon** in the Indian Ocean, **New Zealand**, and the **British Isles** are the most important islands.

Newfoundland and **Vancouver Island** are large islands to the east and west of **Canada**. **Japan** lies off the east of **Eurasia**, balancing the **British Isles** on the west. **Newfoundland**, **Vancouver Island** and the **British Isles** have the same latitude, while **Japan** is further south.

The highlands and mountains.—The **Highlands of East Africa** and **East Australia**, the **Rockies** of **North America**, the **Andes** of **South America** lie parallel to the coast lines of the **Pacific** or **Indian Oceans**.

The **Appalachians** and **Brazil Highlands** form in **North** and **South America** respectively masses towards the **Atlantic Ocean**. The great highlands of **Eurasia** extend from the **Atlas** in **Africa** by the **Alps**, **Carpathians** and **Caucasus** to the **Himalayas**, and thus lie across the general direction of the highlands of the rest of the world. Latitude 40° N. consists almost entirely of a circle of highland and mountains, and stretching from this area of upland there are three lines of upland—the **Rockies** and **Andes**; the highlands of **East Africa**; the highlands of **Malaysia** and **East Australia**—which converge towards the **South Pole**.

Recent exploration.—Notable additions to our knowledge of the world have been made in recent years. **Sir Ernest Shackleton** led an expedition which added considerably to our knowledge of the snow-covered uplands of **Antarctica** in the neighbourhood of **Queen Victoria** and **King Edward VII. Lands**. His route from **New Zealand** is shown in Fig. 2.

Commander Peary led an expedition which resulted in the attainment of the **North Pole**. His route from **Etah** in **Greenland** is indicated in Fig. 2, and his journey showed that there is no land between **Greenland** and the **North Pole**.

Dr. Sven Hedin traversed parts of **Tibet**, marked H in Figs. 1 and 2, and thus revealed to the world hitherto unknown land.

Great circles.—The shortest distance from one place in the world to any other place is along a track which would finally bring the traveller back to his starting place after a journey round the world.

Each meridian of longitude is half of such a track. Tracks of this kind are called **great circles**.

Part of the great circle from **Greenwich to Wellington (New Zealand)** is shown in Figs. 1 and 2. Nearly all the large islands of the world except those in America are near this great circle.

SUMMARY.

1. The continents, except Australia and Antarctica, form the land hemisphere ; centre, British Isles.

2. The Pacific Ocean, with parts of the Atlantic and Indian Oceans, makes the water hemisphere ; centre, Antipodes Island, south-east of New Zealand.

3. The most important islands except those of America lie near a great circle passing round the earth, through London and near New Zealand (Figs. 1 and 2).

4. The highlands lie on the whole towards the edge of the land hemisphere ; *i.e.* near the Pacific Ocean.

5. The area about latitude 40° N. is mainly upland ; that about latitude 40° S. is mainly sea (Fig. 2).

2. The Peoples of the World.

1. Examine Fig. 3. Tabulate the names of those parts of the world where the population is engaged more extensively in industry than in agriculture.

2. In which case does the region of dense population extend farther from the equator than latitude 50° , and in which cases than latitude 40° ?

3. What explanation have you to offer for the dense population engaged in agriculture in N.E. Africa?

The density of population.—Outside Europe and North-East United States, the population is dense only in the very warm countries. **South-eastern Asia, South-eastern United States, the Nile Valley and Central Africa** have dense populations, and, except in the case of America, the people are not white.

In Europe the area of dense population extends about as far north as latitude 60° N., and the area of densest population lies

near the west coast in the **Low Countries** (**Holland** and **Belgium**) and in **England**. The only case outside Europe where there is a dense population farther north than latitude 40° N. is about the eastern part of the boundary between Canada and the United States, from the valley of the river **St. Lawrence** southwards.

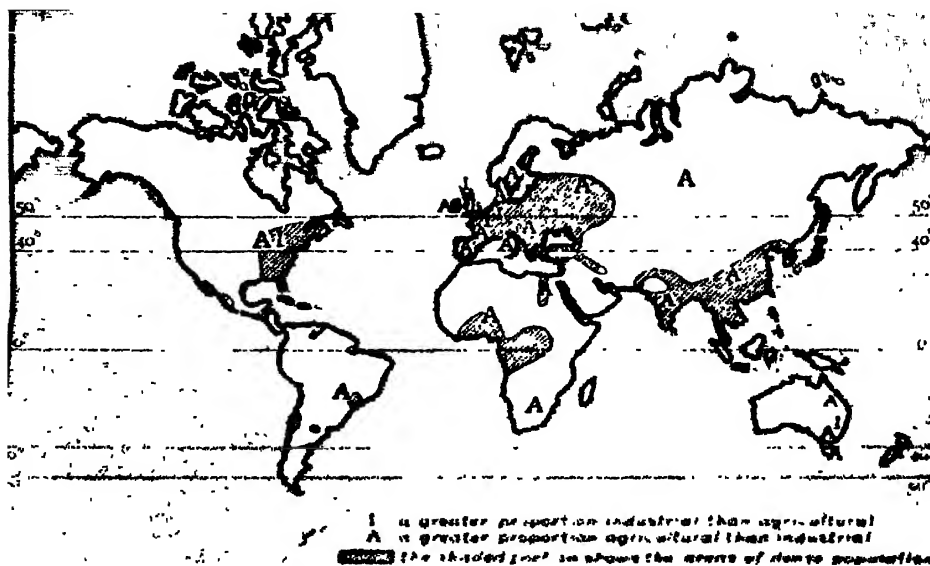


FIG. 2.—THE WORLD'S WORKERS.

Occupations of the people. In olden times, when there was very little carrying of goods and food-stuffs from one part of the world to the other, the majority of the people were engaged in some form of farming; living in the midst of the farmers were to be found men engaged, either during the whole or part of their time, at some form of industry; for example, there were always smiths and frequently weavers. In those parts of the world where, from drought or intense cold, farming operations were well-nigh impossible, such as the desert regions of middle Australia, or the cold regions on the shore-lands of the Arctic Ocean, the people were not even farmers they subsisted upon the results of hunting.

The early farmer owned flocks and herds, and frequently used to rely upon the tillage of small patches of ground for some of his food. The modern farmer relies almost entirely upon tillage, and frequently has animals to supply certain products, such as milk or wool, which he needs only in small quantities.

The growth of shipping, the invention of the electric telegraph, have changed all this. In modern times, the farmer of Australia or Western America farms as a business; he has food-stuffs and raw materials, such as meat and wool, which he sells in the world's markets. If he grows only wheat, the failure of the crop in wheat-lands on the other side of the world may bring him high prices for his harvest; if he rears sheep, he knows that the mutton he sells will probably be eaten by people who live thousands of miles away. Consequently, although the map (Fig. 3) shows that the majority of the people in the world are still farmers, they farm for a different purpose; they farm to sell their produce to feed the inhabitants of distant lands.

The change of purpose has had a second consequence. The modern farmer is intent upon his farming, and therefore leaves industries to others, and thus the map shows that in Western Europe, particularly in England, Belgium, Germany and France, a large proportion of people is occupied in manufactures. In certain parts of Australia, New Zealand, and the United States the people engaged in industries outnumber those who are farmers. Speaking generally, the yellow and black peoples are farmers, the white people are both farmers and manufacturers. In the white man's lands in the newly developed parts of the world—America and Australasia—most of the people are farmers, but gradually a population devoted to industry is arising in the cities and towns.

The people and trade.—The separation of occupations just noted has profoundly affected the world's trade. Ships carry to Western Europe cargoes of food-stuffs and raw materials, the produce of the agricultural workers of distant lands. These cargoes supplement the supplies grown at home. Ships leaving Western Europe and Eastern America carry cargoes of manufactured goods and manufactured food-stuffs, produced by the factory workers to supply clothing, farm machinery, and railways, for use in the agricultural lands.

SUMMARY.

1. Europe has the densest white population, and also the greatest proportion of industrial workers.

2. The new white man's lands of America and Australia are at present agricultural, with a strong tendency to become in parts manufacturing.

3. Eastern Asia* is densely peopled, and sends many farm products to Europe.

4. The densest populations of yellow or black men lie close to the equator.

5. The world's trade largely consists in exchanging farm products from everywhere with the manufactures of Western Europe and Eastern America.

3. The Great Rivers of the World.

1. Fig. 5 shows a map of the world on a projection which gives areas with little or no distortion. On a tracing of Fig. 5, or on a larger map of the same kind, find in the manner shown below by means of squared transparent paper the areas of the catchment basins of the rivers marked.

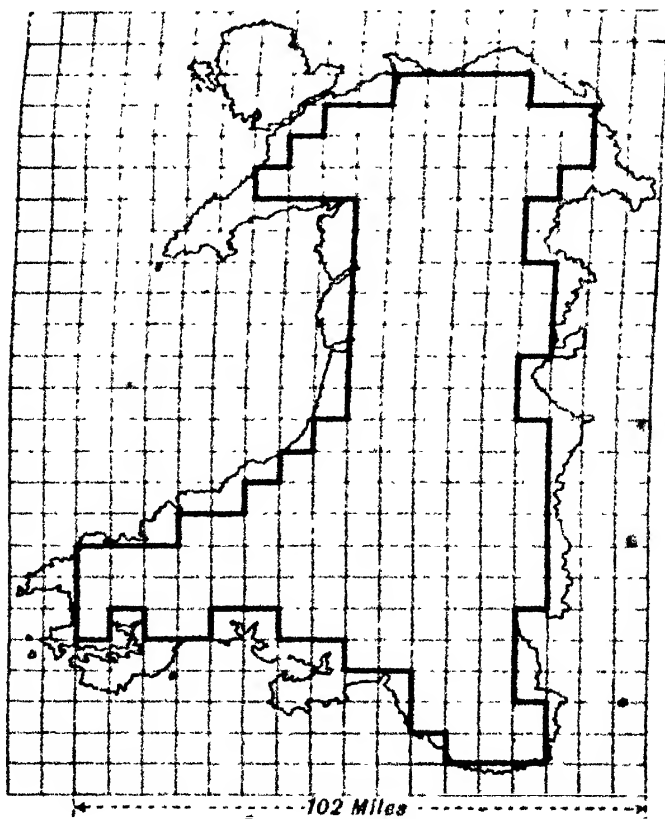


FIG. 4.—AREA OF WALES.

GREAT RIVERS

The measurement of areas from maps.—Fig. 4 shows the method adopted to find from a map the area of a definite region, in this case Wales. The area of Wales is traced from the atlas on squared transparent paper. The stepped line is made to include all the complete squares. These are counted and found to be 156. The broken squares are estimated to be equal to 42 complete squares. The area of Anglesey is estimated at 8 complete squares.

∴ Area of Wales = $156 + 42 + 8 = 206$ squares.

By the scale of the map the sides of 17 squares measure 102 miles ; therefore the side of one square = 6 miles.

∴ 1 square = 36 sq. miles.

∴ area of Wales = 206×36

= 7,416 sq. miles,

i.e. 7,400 square miles (roughly).

GREAT PORTS.	TRADE IN MILLION £.		GREAT PORTS.	TRADE IN MILLION £.	
	Import	Export.		Import.	Export.
1 London	201	116	15 Melbourne	—	—
2 Liverpool	149	152	16 Sydney	—	—
3 Hamburg	115	140	17 Singapore	39	35
4 Montreal	17	16	18 Cape Town	8	17
5 Quebec	2	1	19 Bombay	—	—
6 New York	143	119	20 St. Petersburg	14	10
7 Boston	22	19	21 Shanghai	14	11
8 New Orleans	8	31	22 Yokohama	19	15
9 Para	3	5	23 Rio de Janeiro	—	—
10 Buenos Ayres	41	65	24 Madras	—	—
11 Alexandria	19	20	25 San Francisco	9	8
12 Marseilles	37	30	Havre	37	26
13 Karachi	5	12	Antwerp	98	82
14 Calcutta	33	41			

The great rivers of America.—The Mississippi valley constitutes a large portion (40 per cent.) of the United States, and stretches from the north to the south. The river is a great natural highway down which ships may float to the Gulf of Mexico, and thus forms a means of communication from the interior to the sea. The journey up-stream is more difficult, and thus New Orleans, at the

mouth of the river, has about four times as much an export trade as import trade.

The valley of the **St. Lawrence**, including the Great Lakes, contains about half of the important parts of Canada. The river and lakes provide a water-way from Chicago and Port Arthur to the Atlantic; but in parts the route is dependent upon canals. The outlet for the traffic of this valley past Newfoundland is hampered by ice in winter, and thus a great portion of the trade passes eastwards by **New York**. The trade of **Montreal**, which stands on the St. Lawrence at the limit to which ocean-going steamers can penetrate, is, however, considerable. The table, p. 9, shows that the trade is almost equal to that of Boston and is greater than that of San Francisco. The trade of **Quebec** lower down the same river is only one-eighth of that of Montreal.

In South America, the **Amazon** valley includes much of the inter-tropical land. The river forms the only highway into the interior of the continent, as the land-ways are impenetrable on account of the tropical forests.

The trade of **Para** is small, and the climatic difficulties prevent the river becoming of great importance.

The rivers of the **Plate** estuary tap the regions more to the south. The greater utility of these rivers is shown by the trade of **Buenos Ayres**, which is about fourteen times that of Para. All the rivers of South America have a long course from the Andes towards the Atlantic, and as the country on the eastern slopes of the Andes develops these rivers will increase in importance.

The great rivers of Africa.—The **Congo** is, on account of the dense tropical forest of the neighbouring land, like the Amazon, an important highway; but, like the other African rivers, the Congo offers a bar to navigation by the rapids near the mouth, which prevent free communication to the sea. There is, therefore, no great port at the mouth of the river.

The **Nile**, however, has turned what would otherwise be desert into a narrow trench of cultivated land; it supplies water for the crops of a rainless area; its shipping is blown up-stream by northerly winds and floats down-stream with the current. Thus, Alexandria has a great trade, which will increase with the development of the Sudan under the peaceful British administration. The table shows that the trade of Alexandria is the largest of any African port.

The great rivers of Asia.—The **Indus** and the **Ganges** together

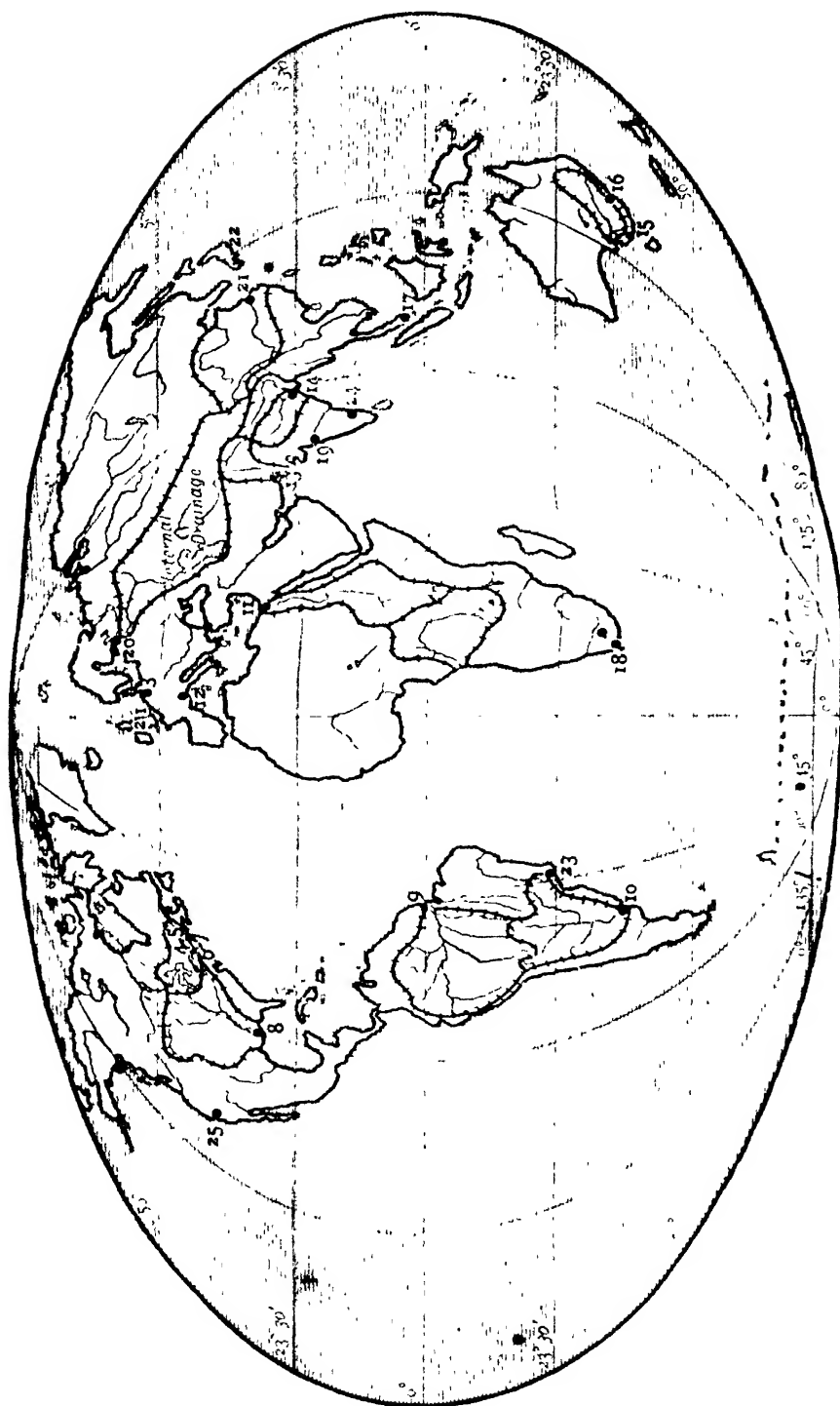


FIG. 5.—THE GREAT RIVERS OF THE WORLD.

make the low-lying land which lies between the elevations of the Himalaya and the Deccan. The high rainfall and the high temperature account for the development in these valleys of a large population, which in this respect is similar to the dense population in the Nile trench (Fig. 3). The Indus flows through a semi-desert region in its lower course, and hence Karachi has neither the trade nor the importance of Calcutta; this is further shown by the great excess of exports from Karachi (Table, p. 9). The rivers of China though larger are not so important, owing to the backward state of the country. The trade of Shanghai is important.

The Murray river. This river, the largest of the Australian continent, turns away from the eastern coast lands, and has built up a large area of alluvial land, which will become fruitful under a well-developed irrigation system such as has been begun near Mildura. It suffers from the frequency of drought and the consequent difficulties of navigation.

The rivers of Europe. The rivers of Europe, the **Rhine, Danube, Elbe, Rhone** and **Seine**, are small in comparison with those of the other Continents.

Hamburg on the **Elbe**, **Antwerp** in Belgium, **Marseilles** near the mouth of **Rhone**, **London** and **Liverpool** are, with the exception of New York, the greatest ports of the Northern Hemisphere; the trade of London exceeds £300,000,000 per annum (Table, p. 9).

Other ports. **Rio de Janeiro, Melbourne, Sydney, Singapore, Bombay, Madras, Yokohama, St Petersburg** and **San Francisco** occur in the table, p. 9, because they are important ports although they are unconnected with great rivers.

SUMMARY.

1. The Mississippi, St. Lawrence, Ganges, and Nile, are the four important great rivers.

2. Montreal, New Orleans, Alexandria, and Calcutta, are great ports on great rivers; but these ports are eclipsed by the great European ports, such as London.

3. The great rivers of the world are not, on the whole, so important as the smaller rivers of Europe, etc., such as the Rhine, Danube.

4. The great rivers of the tropical lands of the Old World are seats of a dense population, mainly interested in agriculture.

4. The Deserts of the World.

1. Name the countries, the kinds of people and their occupations in the desert regions shown on the map (Fig. 6).

2. Compare the map (Fig. 6) with the maps in Figs. 1 and 2 : which hot deserts are lowland, which are upland? Round which ocean does the cold desert stretch? Is this cold desert upland or lowland?

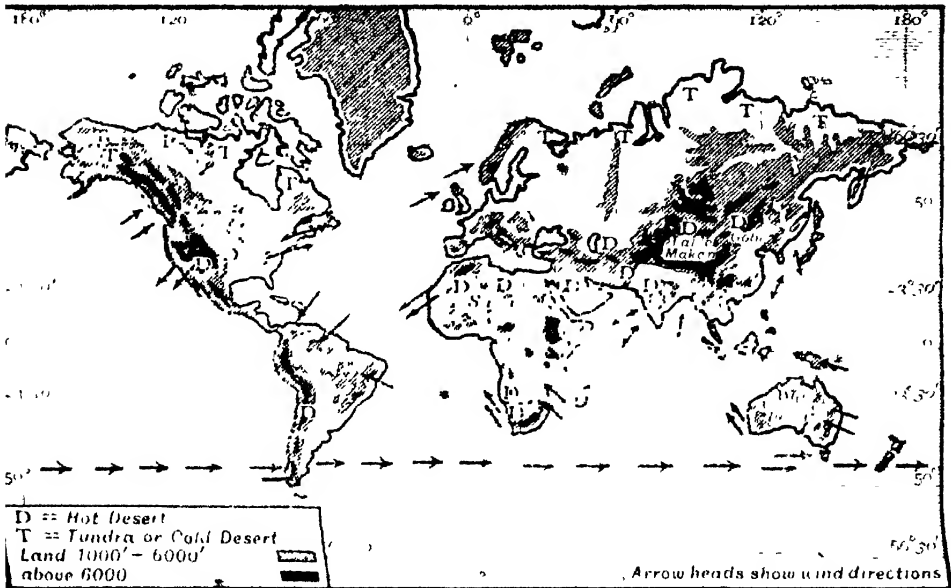


FIG. 6.—THE WORLD'S DESERTS

The hot deserts.—The hot deserts tend to stretch across the world in two belts, about the same distance on each side of the equator; but the actual distribution of the desert land depends also upon elevation and nearness to the sea, and further, upon the direction of the oceanic winds. Where the winds are off the shore, the desert strips reach the coast; where the winds are on shore, the desert recedes from the coast.

The **Sahara** desert reaches the Atlantic shores of North Africa; the **Central Australian Desert** reaches the coast of Western Australia; the **Kalahari** desert reaches the Atlantic shores of South Africa; and the **Atacama** desert reaches the Pacific shores of South America.

In India, however, the desert is pushed, as it were, northwards by the rain-bearing winds of the Indian Ocean, so that the central tableland of Asia is desert, the desert of **Gobi**; while further south,

in the true desert latitude, there only occurs the comparatively small desert of **Thar** in North West India.

The hot deserts are lands where there is no growth of vegetation owing to the absence of moisture. Here and there, water, which has percolated underground into the neighbourhood, makes a spring. In some cases the spring rises to the level of the surrounding land, and in the immediate neighbourhood of this water vegetation springs up; the fringing date palms and the greenness of such places makes them bright spots in the desert. These are the **oases** which determine the routes of the desert traveller, who usually passes in each day's journey from one oasis to another. Sometimes, the water does not reach the land level, and then the camel-men of the desert cut down to the water level. At one place the rock is cut into steps, at another there is a slope, in a third place there is simply a well; but in all cases the precious fluid can be raised to the land level for the use of man and beast.

✓**Arid regions.** Immediately surrounding the true deserts are the semi-deserts or arid regions, where the water supply is scarce. In these areas, the tiller of the soil relies upon some form of artificial canal, by means of which the water he needs is brought to his fields. In Lower Egypt, the peasant or fellah depends upon the great natural canal of the Nile, or on one or other of the canals made for him by his Government. His crops are not watered by rains, but soak up water from the flooded ground.

In Iran, the canals are artificial cuttings underground, and in North West India there are the rivers, the Indus, the Ganges and their tributaries, in addition to the canals cut by the Government. Arid lands depend upon irrigation works for their water supply. The true deserts afford such poor support for human life that the population is scattered and nomadic, the few inhabitants are perpetually in motion, and do not resort to settled habitations. In the irrigated and regions of Egypt and India, however, the canals fix the population, and when the water supply is large the ease with which life can be supported by crops makes these areas the home of dense populations (Fig. 3).

The tundra. - The cold deserts, or barren grounds, which fringe the Arctic Ocean are desert because the climate is too cold to support much life of any kind. In the summer, the surface of the ground becomes soft, and is carpeted with beautiful flowers and tiny shrubs; wild strawberries and similar fruits exist in favoured spots, and for a short season growth is rapid; but soon all is

changed, in the colder months the ground is frozen hard, and then the polar night makes life outside the tiny settlements impossible. In the summer, the inhabitants live in tents or stone huts, but in the winter they build snow houses. During the warm months they lay in stores of animal food, seal, bear, walrus, salmon, and this has to suffice. The result of this is that the settlements are few and separated by great distances, and that the population of the **tundra** is scattered and nomadic—a population of hunters.

SUMMARY.

1. The hot deserts lack water, and support only a nomadic people.
2. The arid regions near the hot deserts depend upon irrigation for water supplies, yield plenteous crops, and support a settled population of great numbers.
3. Near the Arctic Ocean the great cold prevents any vegetable growth except during the short summer, and thus there is only a scattered nomadic people, dependent upon the chase for sustenance.

QUESTIONS.*

1. On an outline map of the World mark with names, Calcutta, New York, Melbourne, Ceylon, the West Indies, Antarctica; the Nile, the Mississippi, the Murray.
2. Specify the parts of the Atlantic Ocean, the continents which have coast lines on this ocean; name the chief islands, the chief rivers which flow into this ocean. Name five great ports on the Atlantic Ocean.
3. Specify the land masses in the water hemisphere. State what you know about their inhabitants and the work they do.
4. Is the country you live in entitled to be called an industrial country? Why so, or why not?
5. What is a *desert*? Where are the deserts of the New World? Can you state any general principle as to their distribution, or account in any way for their occurrence in the regions you have mentioned? (C.P.)
6. Explain why we have such deserts as the Sahara and Gobi. How does it happen that there are oases in these deserts? (C.P.)
7. In what parts of the world are deserts found? Classify the different causes which produce deserts, and explain with regard to some one desert the reasons for its sterility. (L.C.C.)

* For the meaning of the abbreviations at the end of the examination questions, see Preface.

8. The centre of Australia, Tibet, the Sahara, and the plateau of the Western United States have very little rainfall. Can you account for this by any general principle? (L.C.C.)

9. If you spent the month of June in the heart of a district with "tundra" conditions, what account would you give of your life and surroundings there? What changes would you notice if you returned to the same district in the month of December? (Eng. P.C.)

5. The Forests of the World*

1. Make a list of the forest lands shown in the map (Fig. 7). Name in each case the large rivers which serve these lands. Are the forests usually in a lowland or an upland area?

2. On an outline map of the World mark in the temperate forests, the mixed wood and grass land from the map (Fig. 7). Are the temperate forests near to or remote from the sea? On which side of the tundra are the temperate forests, the polar side or the equatorial side?

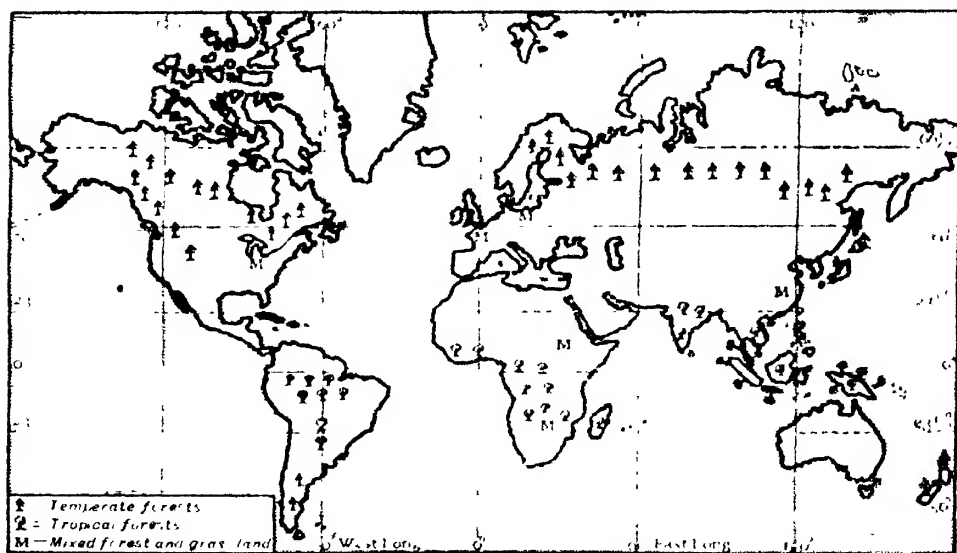


FIG. 7.—THE WORLD'S FORESTS

The hot forests.—In the region of tropical rainfall (Fig. 8), the land is covered almost entirely in its virgin state with dense vegetation, made up of tall trees and dense undergrowth. In consequence, unless it is cleared, the land is impassable for man, and the rivers afford the only avenues for communication, except where roads are cut by main force through the jungle. Certain roads are kept open through the jungle but this is only possible by continuous

effort on the part of those who use the road. These tropical forests are found chiefly on the lowlands, and in **Brazil**, for instance, the river valleys are forested, while the ridges in between the rivers are much freer from trees.

Similarly the valley of the **Zambezi** makes a forest-clad trench through the plateau of South Africa. The density of the forest prevents the growth of a large population, and the darkness of the almost sunless ground prevents the growth of stalwart human beings; the forest peoples are consequently of a low type of civilisation, like the pigmies of the African forest. Further, the profusion of insect and bird life and the constant dampness of the air, cause disease to attack any people other than the natives of the forest, and thus the tropical forest is almost inaccessible to civilised men.

The timber produced from these forests is floated down the rivers to the sea and in this way reaches the markets of the world.

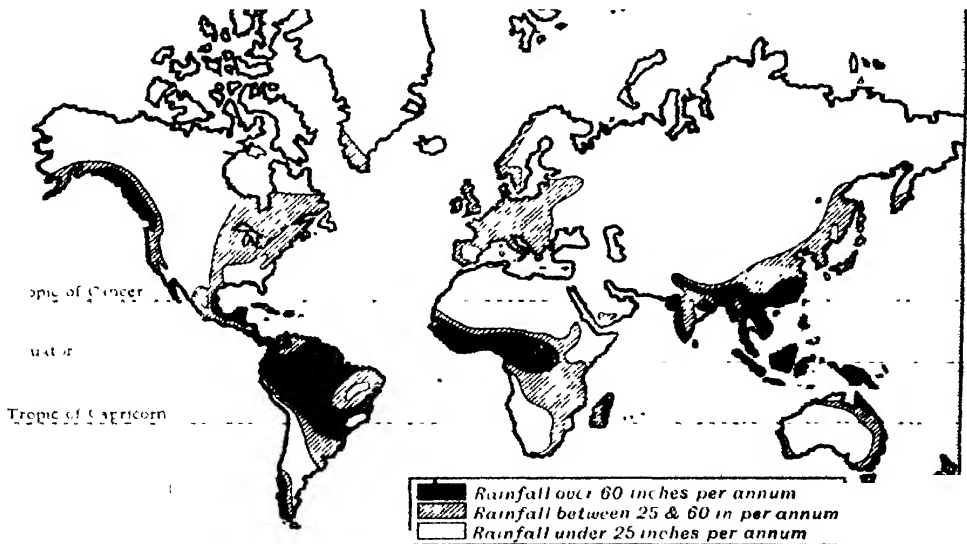


FIG. 8.—THE RAINFALL REGIONS OF THE WORLD

The temperate forests.— These forests reach to the frozen desert, and lie frequently along the seaward side of mountain ranges, where the rainfall is over 25 inches per annum (Fig. 8). The trees tend to be more scattered where the rainfall is less than this quantity; and, where the temperature is only above freezing point

for a short time each year, the trees are stunted and the wood fibre does not become hard. As a general rule, temperate forests are not inhabited by many people, as it is only in the clearings of the forest that farming can be carried on; but the winter snows make it possible for lumberers to cut down the trees during this season and roll them to the edge of the frozen streams, and then pass them down-stream after the frost has broken. The logs thus reach the saw-mills, and pass to the markets. In certain lands, such as the British Isles and Eastern Germany, the ancient forests have been cleared and the land has now become agricultural. A similar clearing away of the trees is taking place in the newer lands in America, and the diminution of the forested areas is causing attempts to be made to plant young trees, in order to ensure in the future adequate supplies of timber, wood pulp, wood tar, and pitch. The trees of the temperate forests are coniferous in the colder parts and deciduous—that is, they shed their leaves in winter—in the warmer areas. The tropical trees are evergreen.

SUMMARY.

1. Trees grow densely in the hot, rainy regions near the equator.
2. The highlands of the tropics tend to be treeless.
3. From the frozen deserts towards the equator the land tends to be covered with trees, gradually of larger size and closer together.
4. In the drier areas the trees are found along the water courses.

6. The Grass-Lands of the World.

1. Make a list in two columns containing the names of the countries which are grass-land regions: (i) on the polar side of the hot deserts; (ii) on the equatorial side of the hot deserts. Underline the name where the grass land region is an upland area (Fig. 9).

2. On an outline map of the World mark the grass-land areas of the Southern Hemisphere. Note carefully the arrangement of these areas round the hot deserts. To what extent do trees occur in these grass-lands? Are the grass-lands wetter or drier than the hot deserts? Colder or warmer? (Fig. 9.)

Grass-lands in temperate climates.—In the Northern Hemi-

sphere, the grass-lands stretch from the temperate forests on the north towards the equator. Where the rainfall is above 20 inches per annum, there the grass-land is mixed with forest. This mixed land occurs in Western Europe and in Eastern America, and typical lowland scenery in this area contains fields of native or cultivated grasses, varied by lines of trees fringing the water-courses and edging the elevated land, the lower heights being

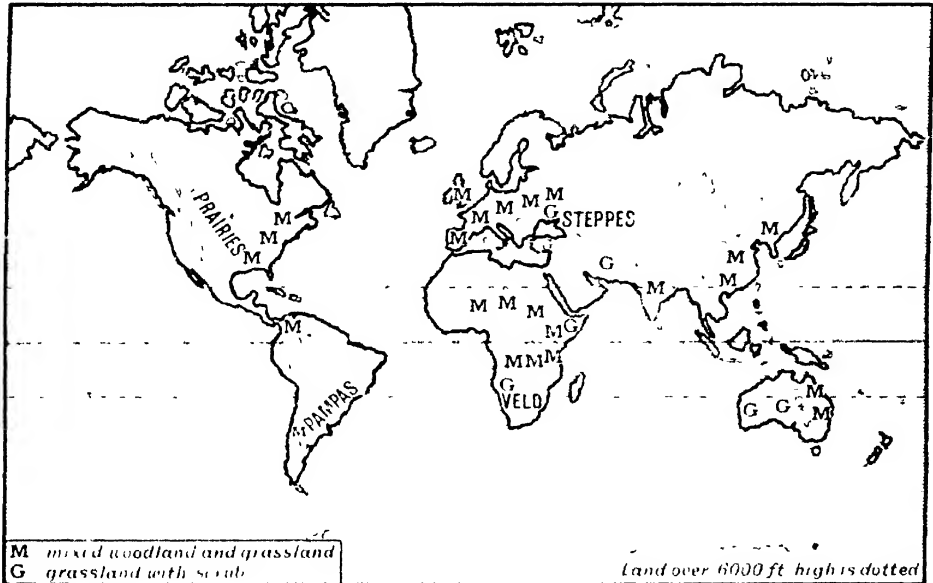


FIG. 9. THE WORLD'S GRASS LANDS

frequently tufted with thin grass, while in many cases the slopes of the steeper heights are forested on their wet sides. Fig. 10 is a photograph which shows a flat valley floor which is grass-land and a tree-clad hillside which slopes upwards rapidly. In many parts of this area the original native vegetation has been modified by the cutting away of the forests, thus leaving the land open to agricultural operations.

Inland on these continents, away from the influence of the Atlantic Ocean, the rainfall is less than 20 inches per annum, and the forest disappears, leaving the plains grass covered; and, further inland, where the rainfall is even less and the conditions approximate to those of the semi-desert, the land has patches of coarse grass in tussocks, sufficiently separated from each other to show the bare earth between.

Pure grass-land is capable of producing large crops of the cultivated grasses or cereals, and a typical scene is that of the vast wheat fields of middle North America, while the drier regions give the typical rolling grassy plains of the **prairie** or the **steppe**. In the temperate parts of the Southern Hemisphere a similar

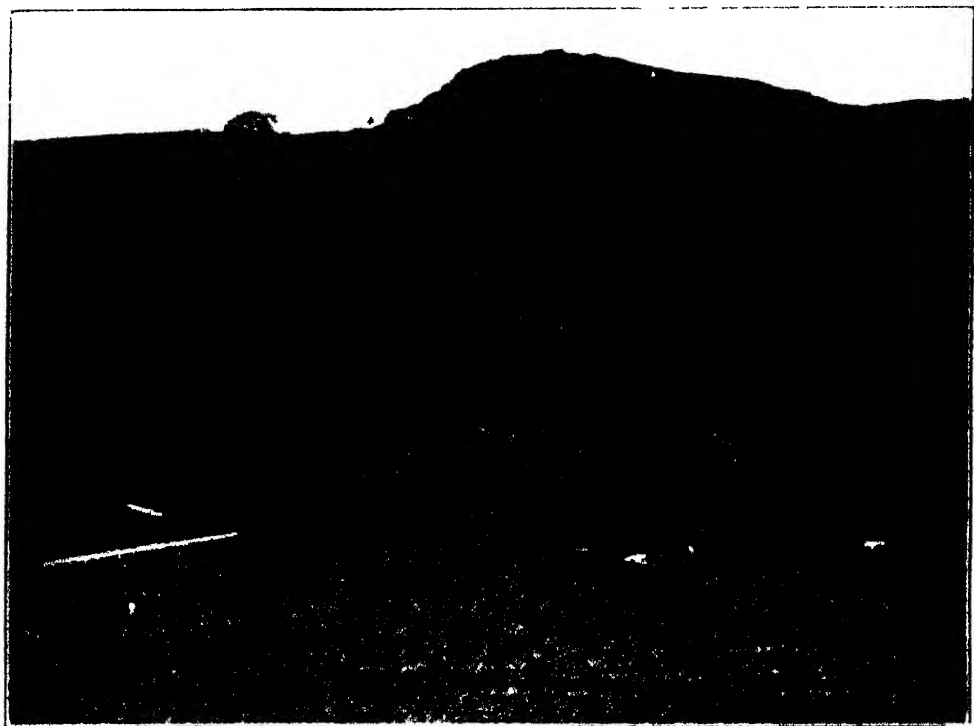


FIG. 10.—MIXED WOODLAND AND GRASS-LAND

sequence occurs, although in each of the three land masses the change from wet to drier regions occurs as one passes from the eastern towards the western shore. Consequently, the mixed woodland and grass-land is on the east, changing to the pure grass-lands—called the **veld** in South Africa, the **downs** in Australia, or the **pampas** in South America—as one reaches the interior. Then the land becomes semi-desert, and finally quite desert towards the west coast. In parts of the latter the rainfall is such that a local change from woods to mixed woodland and grass-land occurs. These changes occur towards latitude 40° S. *

The grass-lands nearer the equator.—The tropical forest thins out to drier grass-land areas on each side. This grass-land

merges into the stony hot deserts further away from the equator. In the summer, during the rainy season, the vegetation is luxuriant, but in the winter desert conditions prevail. It thus follows that these areas are adapted to crops of cultivated grasses which require great heat and moisture, while in the specially irrigated regions the cultivated grasses of more temperate climates can be grown during the dry season of the winter.

The influence of elevation upon vegetation.—Certain mountains in the tropics show snow caps; and thus their summits resemble the frozen deserts, while the foot of the mountain has dense forests. The mountain may exhibit the complete sequence of vegetation from tropical forest to tundra, just as on the lowland the sequence from hot forest to frozen desert arises as higher latitudes are reached. The elevated plains, for example, the plateaus of South Africa, show this effect in the comparative peculiarities of the veld, which in the dry season is parched and the soil friable and rapidly turning to dust, while in the wet season the ground is quickly covered with a carpet of luxuriant vegetation.

SUMMARY.

1. The grass-lands lie between the hot deserts and the forests of both kinds.
2. Where the rainfall is comparatively heavy the grass is thick and mixed with trees, as the rainfall is less the trees disappear and the grass thins.
3. The sequence of vegetation met on passing from lowland to highland is the same as that met on passing towards the poles.

7. Winter and Summer Temperatures of the World.

Examine Fig. 13, having before you a map of the world. Name those parts of the world which have the hottest temperatures in summer. Name those parts which are coldest in winter. Compare the general direction of the **isotherms** (lines showing equal average temperatures of the air) over the land and the sea. Do the isotherms follow the direction of parallels or meridians?

The representation of climate facts.—Imagine an island such as that in Fig. 11. Places on the island have records of

temperature for many years. These are averaged and the result is tabulated

Average Annual Temperatures in Degrees Fahrenheit.

A	37	E	39	H	43
B	39	F	40	K	41
C	41	G	43	L	37
D	41				

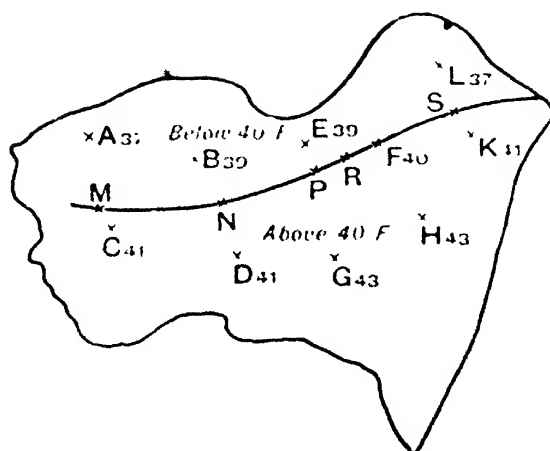


FIG. 11. — AN ISOTHERM.

On a map such as that in Fig. 11, these places are marked and the values entered. By estimate the temperature for M, N, P, R, S is 40° F. e.g. M lies half-way between A and C, P a quarter-way between E and G.

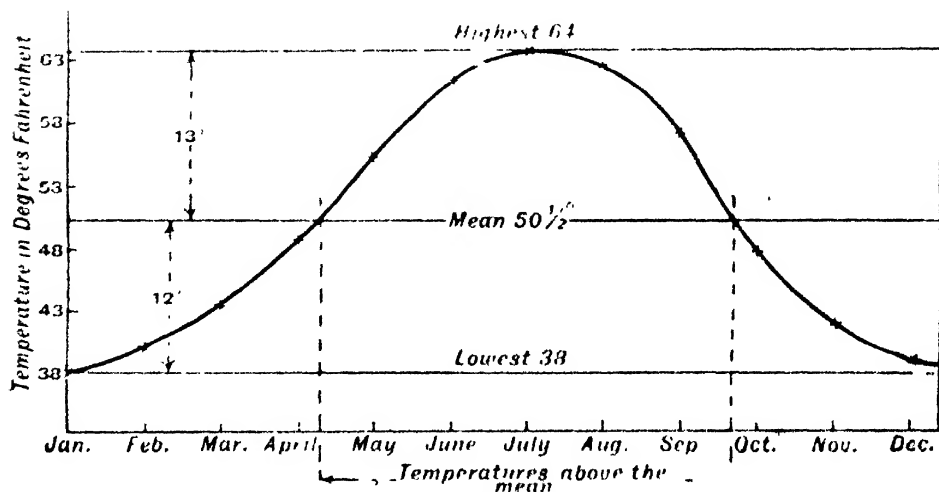


FIG. 12. — A TEMPERATURE GRAPH.

A line is drawn through **M, N, P**, etc., separating temperatures above 40° F. from those below; such a line is called an **isotherm**.

When temperature, etc., is recorded on a map for the yearly average, it is frequently useful to know the change which occurs from month to month, consequently graphs of temperature, etc., are made.

Average Monthly Temperatures in London in Degrees Fahrenheit.

Jan	Feb	Mar	Apr	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
38	40	43	49•	55	61	64	63	58	50	44	40

From a table like the one above a graph is made (Fig. 12). The mean temperature, and the range above and below this mean, are then calculated, and the result expressed. "London temperature, $50\frac{1}{2}$ F. $\pm 13\frac{1}{2}$ - $12\frac{1}{2}$." Temperatures above the mean are experienced for about $5\frac{1}{2}$ months, and below the mean for about $6\frac{1}{2}$ months.

Temperature zones. The distribution of temperature in the Southern Hemisphere is simpler than that in the Northern. The belt between parallels of latitude 20° S. and 60° S. has a temperature ranging in the summer from over 70° F. to less than 50° F. as we pass further away from the equator, and in the winter from 70° F. to freezing point. The land masses of South America, South Africa and Australia are somewhat warmer on their eastern sides than on the west. The summer temperature of Australia is higher than that in corresponding southern latitudes elsewhere.

In the Northern Hemisphere, the temperatures are higher over the land in the summer and lower in the winter. It thus appears that in this region temperature does not correspond with latitude. In summer-time the land in the north has a warmer atmosphere than the land in the south, while in winter-time the air over the southern continents is warmer than that over the north.

The heat equator lies somewhat to the north of latitude 0°. The equatorial belt, between latitude 20° N. and 20° S. has on the average for the whole year a temperature of more than 70° F., and this temperature increases with the height of the sun in the summer to temperatures in the mid-summer month of over 90° F. over the land, so that the lands north and south of the Amazon in South America, Central Africa, the **Deccan**, and the Indian Ocean with the East Indies have an average temperature for the year of 80° F. and over.

The temperature belts of the world can then be summarised thus: the hot belt on both sides of the equator, high temperature

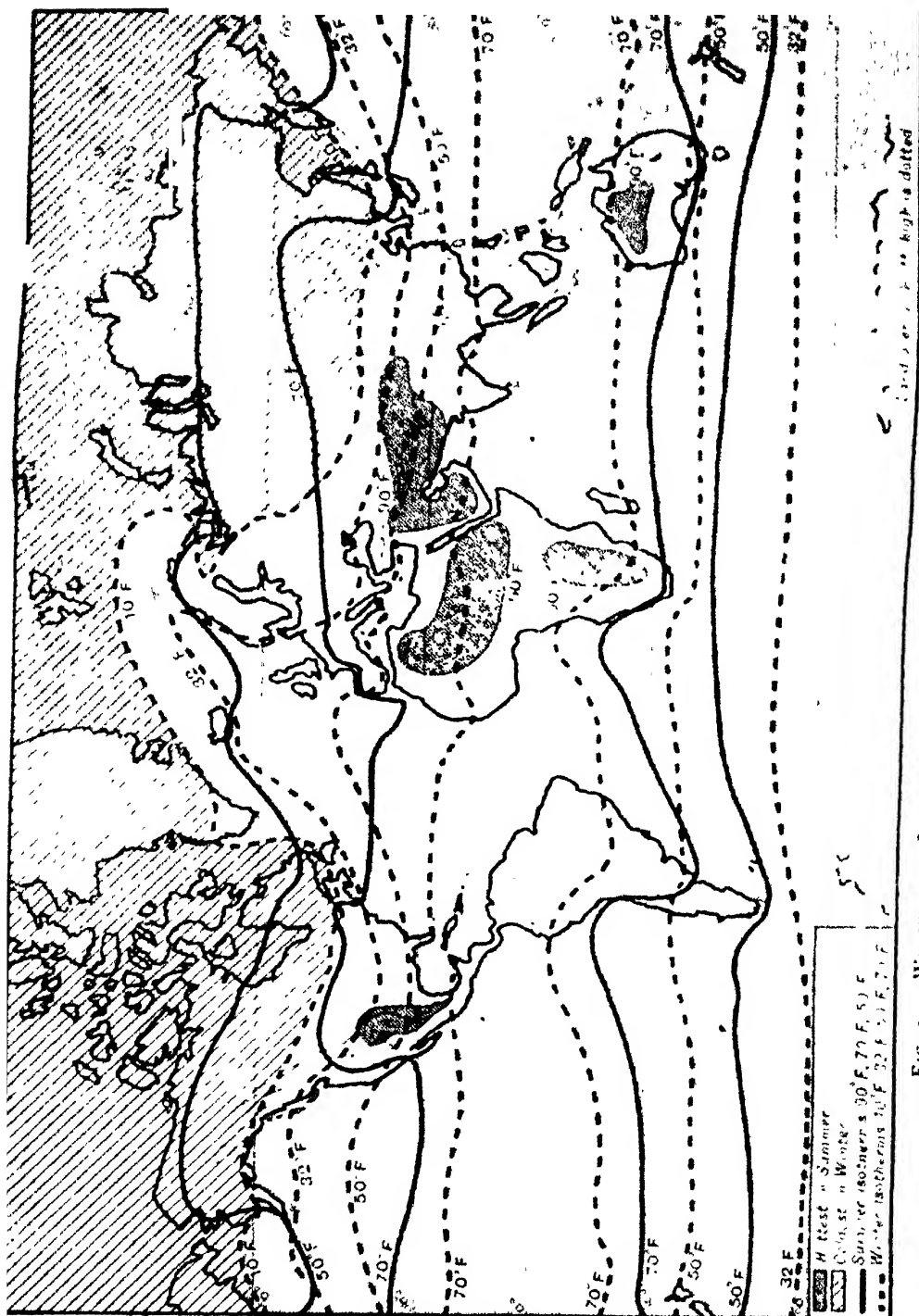


FIG. 13.—WINTER AND SUMMER TEMPERATURES (After Bu. Mar. H. and M. Co.)

with slight variation; the north and south temperate belts, with average annual temperatures between 50° and 70° F., and greater differences between winter and summer in the north than in the south; and finally the north and south cold caps round the poles, where again there are greater differences between winter and summer temperatures in the north than in the south.

Places of special temperature.—The great fluctuations in the winter isotherms in the north, especially those for freezing point and 10° F., show clearly one specially warm area and two specially cold areas in winter. The warm area, sometimes called "**the winter gulf of warmth**," lies in the north-east Atlantic Ocean, and affects the winter temperatures in the British Isles and on the shores of the North Sea. The cold areas cover **Hudson Bay** and its shores and **Eastern Siberia**, and in these regions there is a difference between the coldest and hottest temperatures recorded of more than 170° F., while the greatest difference of this kind recorded for the southern hemisphere is in the middle of the land masses and amounts to about 80° F. only.

The effect of the sea.—The isotherms over the land approach the equator in winter and recede from the equator in summer as they pass from sea to land, thus showing that in general (the sea is warmer than the land in winter and cooler in summer.) (The warmth already noted in the North East Atlantic Ocean in winter is caused by the drifting of warm surface waters over the ocean polewards towards the north-east; while the peculiarly cold patches of sea off the west coasts of South America and South Africa about Latitude 30° S. are due to the presence of cold surface water which wells up from the deeper parts of the ocean, since the wind, which in these regions nearly always blows away from the land, drives the surface water towards the middle of the ocean.)

The effect of altitude.—The temperature of the air falls 1° F. for every 270 feet the observer rises, consequently the temperatures shown in Fig. 11 are only true for those parts of the land which are on the level of the sea. It thus follows that the temperature of the atmosphere in Southern Germany and Central France is about 5° F. lower than that recorded by the isotherms and the temperature of the atmosphere on the high Alps about 10° F. lower. North America, west of meridian 100° W., the greater part of Central Asia, and Greenland experience temperatures about 10° F. lower than those shown in Fig. 11. The great belt of summer temperatures marked upon the map of South Africa is given as

90 F., but the actual temperatures felt are about 80 F. on the average. Similar deductions from the temperatures shown by the isotherms are to be made for the elevated parts of South America and Australia.

Results of high and low temperatures. The patches of land shown in Fig. 13 which have a midsummer temperature of at least 90 F. are the areas of the hot deserts and semi-deserts. The area of country in the Northern Hemisphere which has a winter temperature of less than 10 F., *i.e.* 22° F. at least below freezing point, are the regions of the tundra, or cold desert. Thus, either great heat or great cold occurs in the regions where vegetation is scarce, and where there are therefore few people.

SUMMARY.

1. Isotherms are lines showing average air temperatures; they refer to temperatures at sea-level.
2. The countries of the northern hemisphere have the more extreme temperatures.
3. The N.E. Atlantic is specially warm in winter.
4. N.E. Asia is specially cold in winter and specially warm in summer.
5. Masses of water make the air over the neighbouring lands colder in summer and warmer in winter.
6. The higher one goes the colder it gets.
7. The nearer the pole, the colder the air.

8. The Pressure Regions of the World.

1. Consult the isobars in your atlas, and the typical isobars shown in Fig. 14. An **isobar** is a line joining those places with an equal average pressure for a given period. Name the two permanent low pressure areas, and the six permanent high-pressure areas (Fig. 14). The shaded areas represent permanent depressions, or troughs, in the atmosphere; in these areas the barometer is always low. The movements of the atmosphere which are called **winds** depend upon the direction of the isobars, as given by the following statement (**Buys Ballot's law**): "If you stand on an isobar, with the high pressure on your right and the low pressure on your left, in the northern hemisphere the wind will blow on your back and in the southern hemisphere on your face."

Make a tracing of the outlines of the continents from Fig. 14; place this tracing over Fig. 14, and apply the above rule to mark by means of arrow heads on the tracing the direction of the permanent winds.

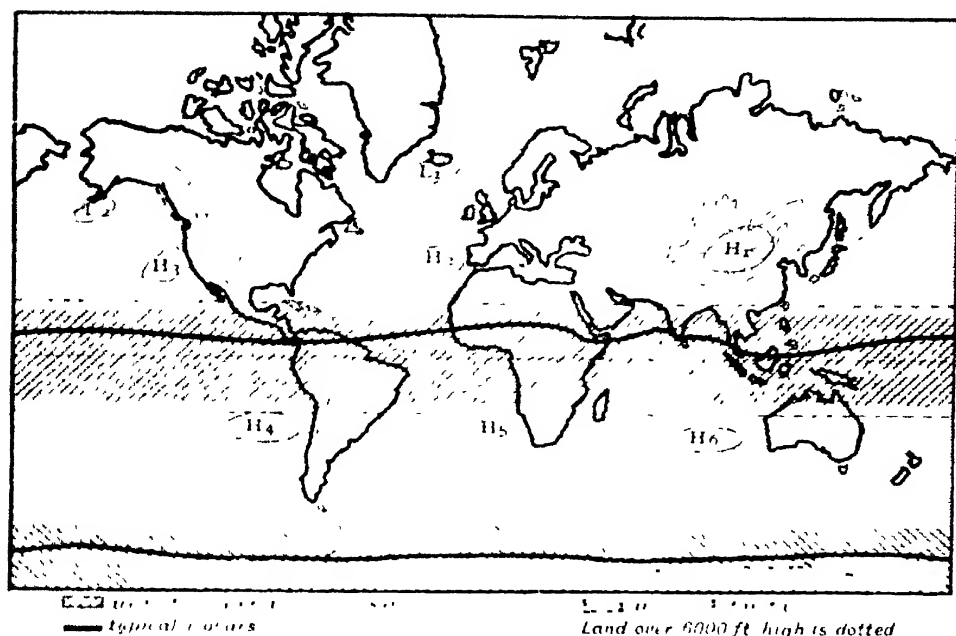


FIG. 14. THE PRESSURE REGIONS OF THE WORLD. (After Supan and Buchan.)

Pressure distribution. The pressure, which is measured by means of the barometer, serves in an approximate way as a method of measuring the height of the atmosphere, or the quantity of air above the place where the barometer is fixed. Since the air is free to move, there must occur movements of air towards a depression or area of low pressure from an area of high pressure; these movements are felt by us on their under side, and are called **winds**.

Consequently those parts of the earth's surface where the pressure is always lower must be places *towards* which winds blow, while *from* those parts where the pressure is higher the winds are slowly moving away.

It thus becomes important to know where these places of permanent high or low pressures occur; they are marked on Fig. 14, and the area marked H. 1 in Central Asia is of great importance, because although the pressure there is high in winter, the pressure is low in summer; this region is the place on the earth where the greatest range of pressure change occurs. From one of the

highest known average pressures, 30.5 in., it passes to one of the lowest, 29.6 in.

This region is also the area of greatest difference in temperature.

The equatorial depression moves slightly northwards or southwards with the sun; when the sun is overhead in the north, the limits of the depression are further north than they are when the sun is overhead in the south. The high-pressure areas are

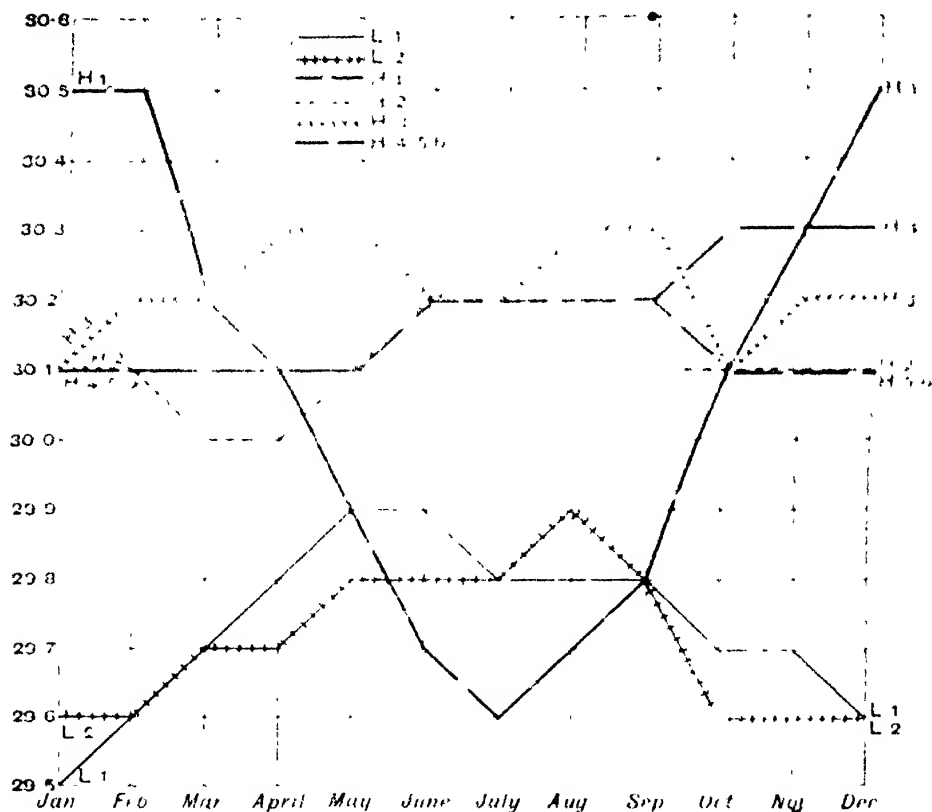


FIG. 15. PRESSURE CHANGES.

shown in Fig. 14 lying in threes over the ocean, roughly equidistant from the equator; the area of high pressure in the months when the pressure is highest extend outwards from the centres marked, and in some months the three southerly areas join and form a belt of higher pressure between the equatorial and south polar depressions. In the north the expansions of the high-pressure regions are complicated by the depressions of the North Atlantic and the North Pacific, but in the winter months the high-pressure

areas are larger than in the summer, and extend some distance over the continents; during these months the high pressure is continuous from Central Asia to the **Azores**.

The striking constancy of high pressures, always above 30 in., in regions H. 2, H. 3, H. 4, H. 5, H. 6, and of low pressures, always below 30 in., in regions L. 1, L. 2 and at the Equator and in the Antarctic Ocean, and the variation in region H. 1, are shown in Fig. 15.

The permanent winds.—The connection between the areas of high and low pressure and the winds is expressed by **Buys Ballot's law**, which states that in the Northern Hemisphere, when the wind is blowing on your back, the low pressure is on the left and the high pressure is on the right. In the Southern Hemisphere the low pressure is on the right and the high pressure on the left. Since there are permanent areas of high or low pressure, and this rule is constant, it is possible to map the permanent winds. Between the high pressure areas and the equatorial depression there occur constant winds, called the **trade winds**, which blow from the north-east in the northern hemisphere, and from the south-east in the southern hemisphere. Between the southern high pressure areas and the south polar depression there blow the **brave west winds**, the *westerlies* or *rearing jolies*.

In the Northern Hemisphere, there is a tendency about latitudes 40 to 50 N. for the wind to blow from the west, but this tendency is somewhat disguised by the special low pressures of Iceland and the Alaskan Sea, with the result that the winds are frequently from the south-west.

The special circumstances of the Central Asian region, accompanied by the abnormally high summer temperatures and the specially low winter temperatures, give rise to the seasonal winds called the **monsoons**, which blow from the north-east in the winter after the manner of the trade wind of the northern hemisphere, and from the south-west in the summer, when they are an extension of the south-east trade winds of the Southern Hemisphere, which have been lengthened in scope and twisted out of their normal direction from south-east to south-west.

✓ **The effect of the land on the wind.** The winds are steadiest over the sea, whilst they are subject to local modifications over the land. In the last lesson it was noted that the cool coast temperatures of the western coasts of South America and South Africa were due to the welling up of cold water to take the place of warm

surface water drifted away over the ocean; this is a permanent effect, and is due to the south-east trade wind. It was also noted that the winter gulf of warmth was due largely to drifts of warm water; these were caused by the westerly and south-westerly winds of the Atlantic Ocean between the Azores and Iceland. The presence of mountains in the track of a wind produces important results which affect the circumjacent area.

In the Alps and in the Rockies a wind is sometimes forced up against a mountain wall, with the result that the wind passes over the tops of the wall and down the lee-side. On the way over the barrier, the wind becomes cooler and drier, but on the way down the lee-side, the wind becomes a warm wind and exerts great melting power, due to its warmth and its dryness, upon the snows which may lie on the mountain slopes; this is known as the **fohn effect**.

✓ **The effect of the wind on the land.** A wind blowing over the sea takes up much moisture, hence, shores against which an ocean wind blows are rainy. On the other hand, an off shore wind means a dry coast land (Fig. 6). When a wind blows from a cold area to a warmer area, it becomes more capable of absorbing moisture with every mile through which the air passes, and thus winds blowing equator-wards tend to absorb moisture, and if they blow over land, they will keep that land dry.

Cyclones. It frequently happens that over a small portion of the earth there develops an area of decidedly low pressure; round this area the winds will circle inwards more or less in a direction which is anti-clockwise in the northern hemisphere and clockwise in the southern hemisphere. These depressions are not still, they move, for example, in the North Atlantic Ocean along a direction which is usually from the south-west towards the north-east.

These storms result in sudden winds which are frequently accompanied by rain. When the depression is very intense the cyclonic disturbance is called a **hurricane** or **typhoon**.

Storm tracks. - The storm tracks of the North Atlantic Ocean are shown in Fig. 16. More than thirty storms per annum pass across North America from the region of the Great Lakes in an easterly direction, and of these about half pass south of Iceland. The usual storm tracks across Western Europe are also shown: tracks I., II., IV., V. run towards the east or north-east, and III. *a* and III. *b* to the south-east. About one-fourth of the storms movements of low pressure - pass along track V.

In the North Pacific Ocean typhoons occur off the Philippines about 19 times a year, and cyclonic storms occur over Japan about

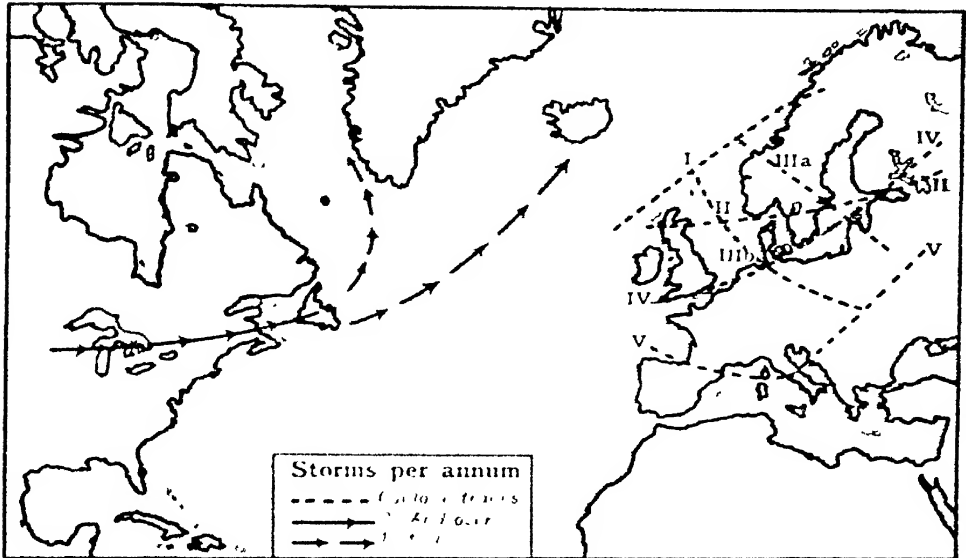


FIG. 16.—ATLANTIC STORM TRACKS. (After Köppen and van Belber.)

70 times a year. In the cold season the track is to the west of Japan (I and III, Fig. 17), and in the warm season to the east (II, Fig. 17), while track IV is followed in the winter

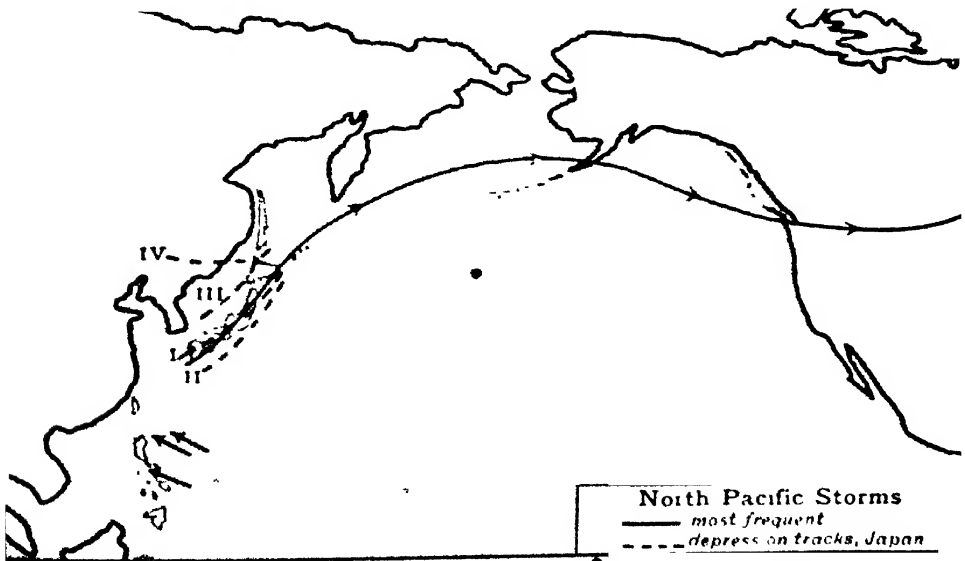


FIG. 17.—NORTH PACIFIC STORMS. (After Doberck, Dunwoody and Knipping.)

Depressions which follow these tracks mean winds blowing from the west on the south side of the lines shown in Figs. 16 and 17. Consequently the warm surface water of the south west of these oceans tends to be drifted towards and piled up against the north-western coasts of Europe and North America. This surface water modifies the winter climate of these coast lands and the exceptional winter warmth which results is shown by the fact that the isotherms of 32° F. and 40° F. for January lie in North West Europe in the direction of the meridians. The net result is that the British Isles are habitable in winter while Labrador is a frozen waste.

Anti-cyclones. When a relatively high pressure is developed over a certain region, there the air tends to be still or to move slowly outwards from the centre of the area towards the regions of low pressure in a direction always opposite to the wind directions of cyclones. Such high pressures tend to endure and are favourable to fine, calm weather. The anti-cyclones of the British Isles are usually special extensions of the Azores or Central Asian high-pressure areas, and so with other areas.

SUMMARY.

1. At the equator and towards the south pole there are regions of permanently low pressure.
2. Near Iceland and near Alaska occur low pressures.
3. In Central Asia the pressure is high in winter and low in summer.
4. In the oceans about lat. 30 there tends to be a belt of high pressure.
5. Permanent winds blow towards the equator (trade winds), and across high latitudes (westerlies).
6. Seasonal winds blow across the Indian Ocean (monsoons).
7. Cyclone winds move anti-clockwise in the north, clock-wise in the south. Anti-cyclone air movements are in the opposite direction.

QUESTIONS.

1. Describe how the air is heated, and also the circumstances which tend to increase or decrease the temperature of the atmosphere. (U.A.)
2. There are two main types of forest: where are they found? Contrast them with reference to position, climate, and products. (C.S.C.)

3. What is an isotherm? Show why it does not coincide in direction with a parallel of latitude and why it varies its position during the year. (C.P.)

4. What are isothermal and isobaric lines? How do the direction of each alter in the northern hemisphere as we pass from winter to summer and why? (C.P.)

5. What is meant by pressure of the atmosphere? How is it measured and how described? (C.U.L.)

6. Describe the course of the January isothermal line of 30° or 32° F. in the northern hemisphere, and account for its most marked deviations from the direction of a parallel of latitude. Contrast its course with that of the corresponding winter isothermal in the southern hemisphere. (C.S.C.)

7. What climatic conditions are necessary for the existence of (a) deserts, (b) dense tropical forests? Give two examples of each. (L.C.C.)

8. There are extensive grass-land areas in the continental land masses of the southern hemisphere. Describe their position and extent. What animals and people are indigenous to these areas? Name the animals which have been imported, and specify the results this has had upon the commerce of the world. (C.S.C.)

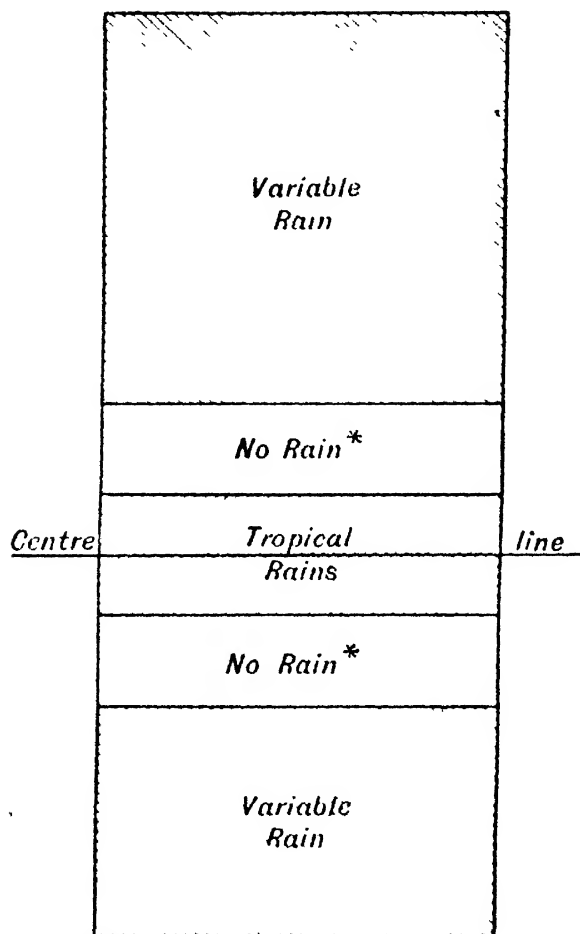
9. Rainfall Regions of the World: Clouds: Sunshine.

1. Make a tracing of the outline of the world from Fig. 13, and also an exact tracing of Fig. 18. Place the tracing of the world map over this second tracing, so that the first time the land masses of America, and the second time the land masses of Europe and Africa, show over Fig. 18. Move the world map so that the centre line on Fig. 18 is successively in the positions of the parallels of latitude named in the table below:

Month.	Jan.	Feb.	Mar.	Apr.	May	June
Lat.	12° S.	10° S.	7° S.	5° S.	0°	5° N.
Month.	July	Aug.	Sept.	Oct.	Nov.	Dec.
Lat.	5° N.	7° N.	7° N.	0°	5° S.	7° S.

When this is done, the extent of the regions of no rain, heavy rain, and variable rain, will be seen as they alter for the successive months of the year. Mark on the world map the limits of the no rain region in the months of January and July. What relation do you observe between the region of heavy rains and the places which have the sun vertically overhead in each month? What land regions have during one season no rain, and during the opposite season rainfall: during which season,

summer or winter, does the rain fall in these areas? Extending the rainfall belt eastwards, and slightly to the north for the land mass of Asia, in what season would you expect to find rainfall in India?



**Except on Coasts with on-shore winds*

FIG. 18.- RAINFALL DIAGRAM.

Rainfall swings with the sun. The sun shines overhead in December south of the equator and in June north of the equator, and appears to swing between these two outside positions first northwards and then southwards. Underneath the sun there tends to fall on the land heavy rains, and these rains swing with the sun, and at the same time the "no rain" region which exists on each side of this belt of tropical rainfall, swings with the sun. Consequently, in January, rain falls on the shores of the Mediter-

anean Sea, and as the year progresses this rainfall decreases, until in the summer this area is practically rainless, the rain returning with the approach of the winter season ; thus this area is a region of **winter rains**. Similarly, in California, South Africa, and South West Australia, there are winter rains. On the south side of the "no rain" area, in Abyssinia and similar latitudes in Africa, in January there is no rain, but rain comes with the summer and disappears with the coming of a new year. This is a region of **summer rains**. India and North Australia are also regions of summer rains.

The winds and rainfall.—Winds blowing on-shore cause the coast strips of a country to be wet, and thus the western coast lands of Europe are wetter than the interior. Winds blowing off-shore make the coast lands dry ; therefore the west coasts of South Africa and South America are dry and arid, while the eastern shores lie in the tracks of winds and are wet. In India, Abyssinia, South China and North Australia, one of the monsoons blows shorewards, and consequently the season of this monsoon, which in each case is the summer, is a wet season ; the other monsoon blows towards the ocean, and the cool seasons in these lands are dry.

Cyclones and rainfall.—In the areas on the polar sides of the areas of high pressure the wind movements are usually accompanied by cyclonic disturbances or storms. These storms travel usually in a direction which is fairly constant, and maps are made showing the storm tracks for all these areas. Fig. 16 shows the storm tracks for the Atlantic Ocean. In the region there shown, as the cyclone passes along its track rain falls on the left front. Cyclones are more frequent when there is a large difference between the pressures at two places fairly close together, and consequently, since in the area shown (these differences are least about the month of May and greatest in the winter season, it happens that the rain falls at all seasons, that is, the area has variable rains, with a tendency towards a maximum in the winter.)

One result of this is the heavy rains in autumn in the British Isles.

Rainfall and altitude.—A map showing the annual rainfall of Europe, by means of rainfall lines or **isohyets**, is very similar to a map showing by contours the mountain masses. The regions of greatest rainfall are the regions of highest land. In the countries which have seasonal rains, the annual rainfall map shows

clearly the influence of the mountains, where the latter lie close to the coasts and receive on-shore winds from the neighbouring ocean. In North West America, in India, in Malaya, and in East Australia the rainfall is largely on the windward side of coastal mountain ranges. The detailed rainfall maps of the British Isles show that a sudden splash of rain may fall in a small area and cause that area to have in the monthly rainfall map an unusually heavy rain; but the annual maps are more or less alike in this one respect, that the heavy rains occur on the elevated lands. In a dry year or in a wet year the wettest areas are elevated.

Cloudiness and sunshine. Sunshine is measured by the total number of hours during a period in which the sun has shone, but cloudiness is measured in the average number of tenths of the sky which are cloud-covered during the period. Thus, the measurement of sunshine is a total as in the case of rainfall, while cloudiness measurements resemble temperature and pressure measurements in being averages.

Sunshine usually increases in extent as the equator is approached, but the extreme south of a country in the northern hemisphere is not always the sunniest, the sunniest part of Europe is central Spain, and that of North America is north of lat. 30° N. On the whole the maximum sunshine occurs in the areas where the skies are habitually clear (Fig. 19), and these regions are usually extremely dry and appear on a map showing annual rainfall as places with less than 10 in. of rain per annum.

Lines on a map showing equal totals of sunshine are called **isohels**; those showing equal averages of cloudiness are called **isonephs**.

Clear skies and pressure.—The regions in which the barometer is as a rule high are regions where the skies are usually less than four-tenths cloudy (Fig. 19): this is seen most clearly in connection with the changes of pressure in Central Asia; when this area has a high barometer—in the winter months—the skies are clear, but during the summer months when the pressure is low the skies are more overcast. Similarly, the definite regions of low pressure are regions where the sky tends to be at least seven-tenths cloudy; as the low pressure and tropical rainfall belt of the equator swings with the sun so the area of cloudy sky changes.

The hot deserts are regions of clear skies (Fig. 19).

Rain regions and cloudiness.—The south-west Indian monsoon area has heavy rains and cloudy skies simultaneously; the winter

rain regions have cloudy skies in the winter and clearer skies in the summer. The regions of comparative aridity are marked by continual clear skies (Fig. 19).

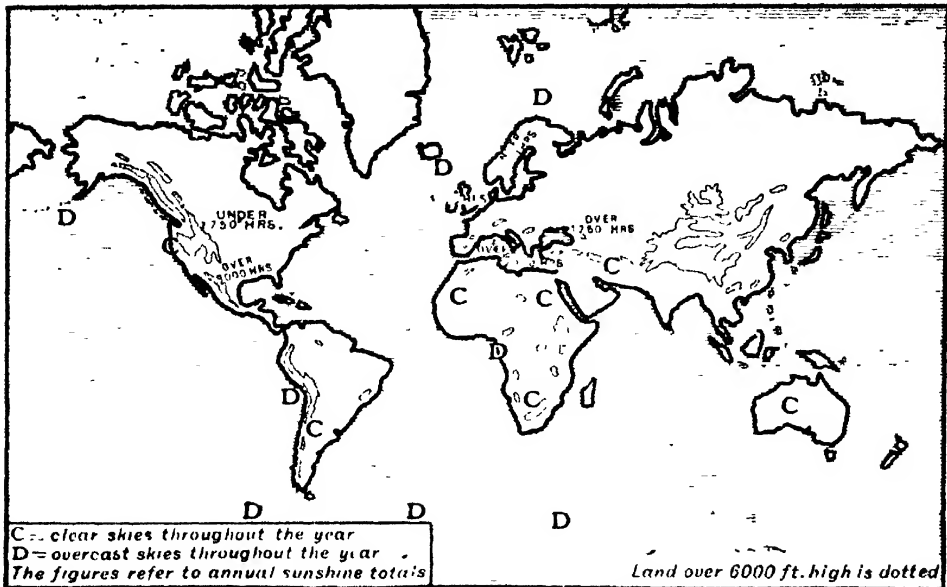


FIG. 19.- CLOUDS AND SUNSHINE. (After de Bort, König, van Bebber and Dickson.)

SUMMARY.

1. Rainfall swings with the sun.
2. About lat. 7° to 27° on each side of the equator is an arid region.
3. On the polar sides of the arid regions are regions of rain in winter, either January or July.
4. On the equatorial sides are the regions of summer rains.
5. The monsoon rains of India, China, Australia are specially developed forms of summer rains.
6. High pressures, absence of rain, and clear skies occur together.
7. Low pressures, rainfall, and overcast skies occur together.
8. Sunshine increases from the poles towards the equator, but the increase is not uniform owing to the presence or absence of cloudy areas.

9. The names of the instruments and those of the lines used to record the results upon maps are given below.

Climatic Factor.	Instrument used in Measurement.	Name of Line on Map.
Temperature	Thermometer	Isotherm
Pressure	Barometer	Isobar
Rainfall	Rain Gauge	Isohyet
Sunshine	Sunshine Recorder	Isohel
Cloudiness	Nephoscope	Isoneph

10 Vegetable Products of the Grass lands.

1. Fig. 20 shows the world's trade in wheat; the large growers, the large exporters, and the large importers are marked. Make similar maps for the other cereals. For large growers see p. 71

Cereal	Large Exporters	Large Importers
Rye	Russia, Germany, Roumania	Holland, Norway, Sweden
Barley	Russia, U.S.A., Turkey, Roumania, Canada	United Kingdom, Norway
Oats	Russia, Roumania, Canada, Germany, Turkey, U.S.A.	United Kingdom
Maize	U.S.A., Argentina, Roumania, Russia	United Kingdom, Germany, Holland, Belgium

Make a table to show for each cereal the range of latitude within which it is grown. This can be done from the maps.

Great world industries.—Wherever civilised man is, there he works; and the forms of work he uses are classified as follows:

- I. Arable farming = tilling the ground.
- II. Pastoral farming or ranching = keeping flocks.
- III. Lumbering = felling trees and preparing them for market.
- IV. Mining or quarrying = obtaining some form of rock and preparing it for market.
- V. Fishing = securing sea animals and preparing them for market.
- VI. Manufacturing = taking some product from one of the above four industries and altering it so that it can be bought and sold.

VII. Transporting=taking goods, *i.e.* the results of previous operations, from seller to buyer.

VIII. Merchanting=providing the means of buying or selling goods.

Industries I. to V. are primary industries, since they deal with raw materials.

✓ **The cereals.**—The chief cereal—**wheat**—is grown in so many latitudes that no month of the year passes but crops of it are

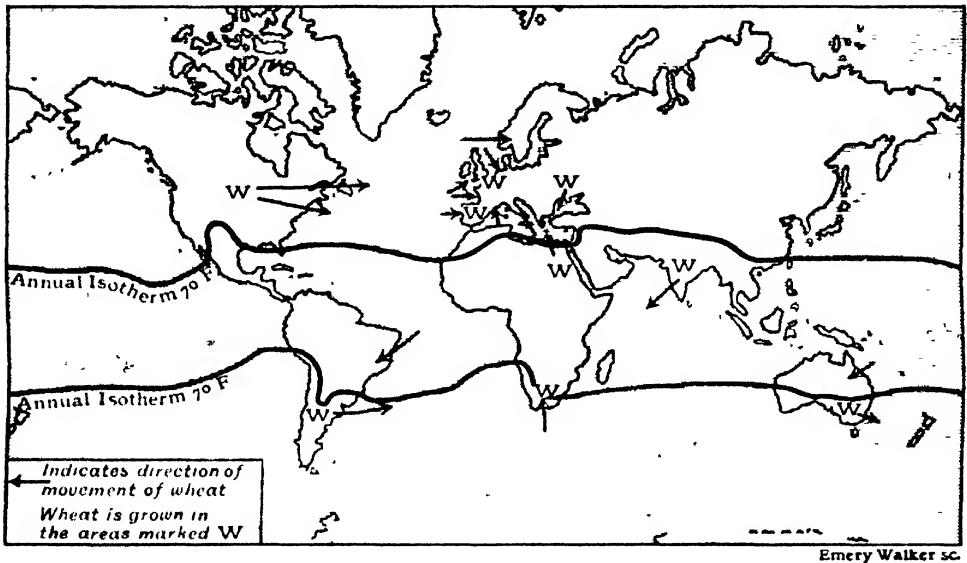


FIG. 20.—WHEAT PRODUCTION AND MOVEMENT.

harvested in some part of the world. The best crops are grown where there is a hot, dry, and sunny harvest time, while in general the temperature required for successful wheat cultivation is higher than that required for the other cereals except maize.

Rye is the cereal which flourishes best on poor soil and in cold climates, consequently Germany, Belgium, and Russia grow more of this cereal than of wheat. It furnishes the flour for the bread of large numbers of people on the continent of Europe.

Barley ripens very quickly, and in consequence has a greater range of climate than any other cereal. It is grown with oats in the lands where it is too cold for wheat, and is grown with wheat in the lands where it is hot and yet too dry in summer for maize.

Oats are best grown on land which has a cooler and wetter summer than is required for wheat, and thus is grown in the lands where rye is grown extensively.

Maize requires long hot summers with a fair rainfall, and on this account is not grown in the Mediterranean climes as they lack summer rainfall. The United States produce about two-thirds of the world's crop of maize.

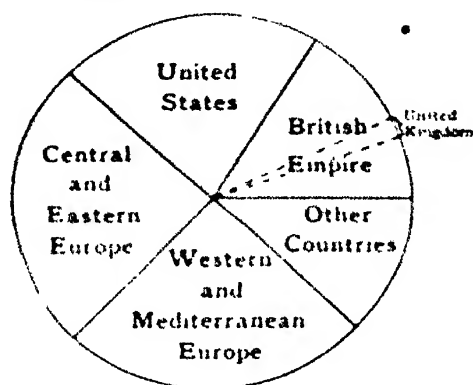


FIG. 21.—WORLD PRODUCTION OF WHEAT.

The diagram, Fig. 21, was made from the table on p. 69, to represent the production of wheat. It shows that Europe grows about half the world's wheat, and the United States about as much as the British Empire.

WORLD PRODUCTION OF CEREALS IN MILLION BUSHELS: SUMMARY BY CONTINENTS.

	Wheat.	Oats	Barley.	Rye.	Maize.
N. America - - -	795	1059	204	33	2770
S. America - - -	173	-	-	-	151
Europe - - - -	1724	2415	896	1474	521
Asia - - - - -	418	84	56	65	-
Africa - - - -	64	14	48	-	41
Australasia - -	67	30	3	-	9
Total - - - -	3241	3602	1207	1572	3492

The table is made from the detailed table on p. 69. The figures are the best available and show that Europe is the great grower of

cereals, and it produces nearly all the rye, about half the wheat and about two-thirds of the oats. North America ranks next, producing nearly all the maize, almost one-third of the oats and about one-quarter of the wheat. The figures here and the details on p. 69 show that the production of the cereals is world wide, although the countries of the Southern Hemisphere do not, at present, grow large quantities.

WORLD PRODUCTION OF CEREALS EXPRESSED AS PERCENTAGES.

	Wheat.	Oats.	Barley.	Rye.	Maize.
United Kingdom	1.7	5.0	5.4	—	—
Australasia -	2.0	0.9	—	—	0.3
Canada -	3.7	7.2	3.9	—	0.7
India -	8.8	—	—	—	—
Brit. S. Africa -	—	—	—	—	—
Rest -	1.0	0.1	1.0	—	1.6
United States -	20.7	22.2	13.3	1.8	77.0
Argentina -	4.7	—	—	—	4.2
Russian Empire -	17.9	25.7	28.8	51.0	1.4
Western Europe * -	15.0	27.2	20.3	29.0	0.6
Central Europe † -	19.2	11.5	20.2	13.0	12.2
Rest of World -	5.2	0.2	7.1	5.2	2.0

* Germany, France, Belgium, Netherlands, Denmark.

† Austria-Hungary, Bulgaria, Roumania, Italy, Servia, Spain, Portugal.

The great cereal growers.—Under present conditions the British Empire does not produce any large share of the world's cereal crops; except wheat in India, the crops are largely confined to the United Kingdom and Canada. As shown by the percentages in the table, the Empire produces no rye, very little maize, one-tenth the barley, one-eighth the oats, and one-sixth of the wheat.

The United States have larger production of each kind, and produce three-quarters of the world's maize.

The Russian Empire has a larger production of oats, barley and rye than the United States, and produces half the world's rye.

Western Europe produces less wheat and maize but more oats and rye than Central Europe.

Cereals on the grass-lands.—Grass-lands are useful in two ways, for arable farming and for pasture; the arable lands are

largely used for growing cereal crops. From the warmer grass-lands on which wheat is grown polewards, the crops are maize, oats, rye, with barley of one kind or another a possible crop everywhere. Cereal food-stuffs form a staple article of diet, and the prevalence of cereals in the grass-lands has been one cause of the numerous population which inhabits these areas. At the same time the growing of cereal crops requires effort and attention almost everywhere, and thus the grass-land peoples tend to be hardy, industrious, and energetic. The problem of feeding the dense populations of Western Europe is of considerable importance, and thus the extensive cereal fields of Russia, Roumania, and the United States find an outlet for their surplus crops. This surplus tends to decline in quantity, and it is likely to be a problem of some magnitude as to the grass-lands which can supply Western Europe when this surplus no longer exists. In this problem lies the opportunity of the grass-lands of the British Empire.

The trade in cereals. -- The main movement of cereal products is towards Western Europe, and thus the ships which carry away from this land the manufactures and minerals can secure a return cargo of food-stuffs in the raw state. Now that the cereal crops in every land are a matter of importance for the whole world, cereals form a considerable part of the cargoes of ocean-going ships.

SUMMARY.

1. Cereals are grown on the grass-lands where there is sufficient rainfall, the drier lands are used for ranching.
2. Wheat is the most widely cultivated cereal, rye the hardiest.
3. Maize has the most limited area of cultivation on account of its requirement of a warm moist summer.
4. Russia, Roumania, the United States and Canada are the great producers of cereals, while in the Argentine they are receiving increasing attention.
5. The surplus crops of the great growers are decreasing owing to the increase in population ; this is specially true in the United States.
6. The transport of cereals occupies a large part of the mercantile marine.

11. The Animals of the Grass-lands.

ANIMALS ON THE GRASS-LANDS AS PERCENTAGES OF THE TOTALS.

	Horses.	Sheep.	Pigs.	Cattle.
United Kingdom	24	52	28	26
Australia - -	21	142	0.7	2.1
Canada - -	2.3	0.5	2.3	1.6
India - -	17	38	—	26.1
Brit. S. Africa -	0.5	4.9	0.4	0.8
Rest - -	0.9	4.4	0.1	1.2
United States - -	23.7	9.7	41.0	16.0
Argentina - -	8.6	11.6	1.0	6.5
Russian Empire -	35.2	12.0	9.5	10.4
Western Europe *	12.5	9.9	27.0	11.8
Central Europe †	8.1	10.0	13.9	6.6
Rest of World -	2.0	13.8	1.3	14.3

* Germany, France, Belgium, Netherlands, Denmark.

† Austria-Hungary, Bulgaria, Roumania, Italy, Servia, Spain, Portugal.

1. Examine the above table. Mark on an outline map of the world the regions which have large numbers of each kind of animal in proportion to their area. What relation do the countries marked bear to the great natural region of the grass-lands? Specify by name the countries which have large numbers of each kind of animal.

2. The table, p. 44, gives particulars as to the meat consumption of the United Kingdom. Mark the countries named as exporters to the United Kingdom by arrow-heads pointing towards Britain in the map of the last exercise. Make diagrams similar to Fig. 21 to illustrate the facts in the table.

3. Make a tabular statement from the tables on p. 44 and pp. 70-1 to show (i) the percentages of the world's sheep, (ii) the percentages of the world's wool production, and (iii) the percentages of the supply of wool to the United Kingdom for the United Kingdom, Australia, New Zealand, Russia, Argentina.

TRADE IN MEAT OF UNITED KINGDOM IN MILLION CWTs.

	Beef.	Mutton.	Pigmeat.	Total.*
Home production	14	6	6	26
Imports from :				
U.S.A.	3		3.5	7
Argentina	3	1.4		5
Canada	1		1	2
New Zealand		1.5		2
Australia		0.6		1
Denmark			2	2
Holland			0.5	1
Other countries	2			2
Totals	23	9.5	13	48

* Includes meat unenumerated

PRODUCTION OF WOOL IN MILLION LBS.

	Pro- duction	Exports to U.K.		Pro- duction.	Exports to U.K.
Argentina	347	36	Uruguay	87	6
Chile	20	18	U.S.A.	271	3
France	78	22	Australia	573	297
Turkish Empire	75	9	New Zealand	160	155
Peru	7	6	S. Africa	83	79
Russian Empire	408	5	India	50	42
United Kingdom	133		Others	508	24
			Totals	2800	702

Mark these countries by the word "Wool" on the map of Exercise 1, and show by arrow-heads the lines of trade to the United Kingdom.

Animals.—The accompanying table, p. 45, and that showing percentages on p. 43 are compiled from the detailed table on pp. 70-1.

The percentage table shows the great differences which occur in the distribution of animals: horses are to be found in connection with cereals; cattle—except in the case of India—occur mainly where there are cereal crops; pigs preponderate, as does maize, in the United States.

**ANIMALS ON THE GRASS-LANDS IN MILLIONS: SUMMARY
BY CONTINENTS.**

	Horses.	Sheep.	Pigs.	Cattle.
N. America - - -	24.2	62.5	60.4	88.9
S. America - - -	8.8	98.6	1.8	71.9
Europe - - -	43.4	180.0	68.7	139.3
Asia - - -	12.6	87.9	4.1	127.5
Africa - - -	0.7	41.7	1.1	8.8
Australasia - - -	2.2	102.9	1.1	11.2
	91.9	573.6	137.2	446.6

Europe has half the horses and pigs, one-third of the sheep and nearly one-third of the cattle.

Australia has comparatively few animals except sheep, of which there is almost one-fifth.

Asia has few animals except cattle.

North America has comparatively few sheep, while South America has many sheep and cattle.

Africa has very few animals; sheep preponderate, but of these there is only about one-fourteenth of the world's flocks.

Ranching (Stock-raising).—The rearing of animals for food purposes on the grass-lands is called ranching, and is the occupation of people who inhabit the drier grass-lands. In North America, for example, the grass-lands towards the east have a greater rainfall than those further west. In the east the grass-lands are arable, in the west they are pastoral. Similarly in Eurasia, the lands nearer the Atlantic are arable, further away and drier they are pastoral. In Australia, the Downs are towards the dry interior. It thus appears that the stock-raising grounds, or ranching lands, are on the fringes of the hot deserts, with a rainfall of from 10 to 25 inches per annum (Fig. 8). One fact, however, must be noted: pigs are reared near the temperate forests.

Horse-rearing.—Russia and the United States are the lands which have many horses. (Table, pp. 70-1.) Taking the United Kingdom as a unit, it is found that there is in that country one horse to from twenty to twenty-five people; in the United States,

with roughly double the population, this becomes a ratio of one for five people. Russia has about the same ratio as the United States. Of the countries of Europe, Austria-Hungary has a ratio of one for eight people, France and Germany one for thirteen people. Within the British Empire, Canada, Australia and New Zealand have one horse for three people, while the great grass-lands of Argentina support one horse for each member of the population. This last fact is a striking testimony to the nomadic habits of the people on the pampas.

Cattle and meat.—In certain of the older countries, such as India, cattle are used as draught animals, and so compensate for the comparative scarcity of horses ; but in the newer grass-lands, cattle are reared for the purpose of supplying beef. This appears in the table on p. 70, in the large numbers of cattle in Argentina and the United States, where the cattle are in much greater numbers than in the older countries of Western Europe—France, Germany, and the United Kingdom. It thus is possible for these two areas to supply the United Kingdom with about 13 per cent. each of the beef which is needed for her 43 millions of people. The United States contains about six times as many cattle as the United Kingdom, while the Argentine has twice as many. Assuming that beef is eaten to the same extent in the three countries, the United States would need about 26, and the Argentine about 3 million cwts. of beef per annum. Of these amounts, the United States produces approximately about 84, and Argentina about 28 million cwts., leaving about 58 and 25 million cwts. for export from each country. This leaves about 50 and 20 million cwts. for other countries than the United Kingdom. These surpluses are only approximate, but they serve to indicate the fact that the United States and Argentina supply a great portion of the beef which is eaten both in America and in Europe.

Sheep, wool, mutton.—The distribution of sheep in the world is remarkable for the large numbers in the Southern Hemisphere. Relative to their population Argentina, Australia, New Zealand, and South Africa contain a great preponderance of sheep, and this is most marked in New Zealand. In Western Europe the preponderance of the number in the United Kingdom is well marked : while in N. America sheep are relatively less numerous than cattle. Taking the world as a whole, sheep are pastured on the grass-lands, although as the demand for wheat forces the farmer to turn

his pasture into arable land the sheep tend to disappear, for the wheat-growing and cattle-rearing to be carried on in the same area. For the supply of mutton Argentina is almost equally as important as New Zealand, especially for the United Kingdom: this appears in the table on p. 44, where also is shown the fact that New Zealand, with only about one-quarter of the sheep of Australia, supplies Britain with three times as much mutton.

As the cattle and wheat fields of Argentina increase in consequence of the declining surpluses of wheat and beef in the United States, it is to be expected that Australasia will supply Britain with an increasing proportion of mutton. "Mutton tends to be driven out by corn, and subsequently by beef and pig-meat. The most advanced stage of this process is to be seen in Europe; it is in a much earlier stage on the American continent". thus, ultimately, the country with the largest surplus of mutton will finally be Australia.

At present the sheep of Australia are mainly utilised for the supply of wool, and thus Australia stands at the head of the list as regards the production of this raw material, and balances the deficit in mutton by producing $3\frac{1}{2}$ times the wool of New Zealand and sending over $1\frac{1}{2}$ the amount sent by New Zealand to Britain. The fact that most of the wool produced in the world is produced in British Colonies, appears in connection with the British re-export trade in this commodity. Britain exports about 36 per cent. of her total supply of wool, and of this about 19 per cent. is home grown. Of this export a large proportion (about 68 per cent.) is sent to the four nearest countries across the British seas, and of this amount about 97 per cent. is colonial wool.

Pigs and pig-meat.—Austria-Hungary, Germany, Canada, and United States are with Russia the lands of many pigs. The United Kingdom imports about as much pig-meat as she produces, and for this she takes nearly all the available supply of Denmark and goes to North America for the major portion of the rest, Canada supplying about 30 per cent. of this.

SUMMARY.

1. The grass-lands are at first pasture grounds, mainly for sheep and cattle.

2. As the grass-lands become arable, sheep give place to wheat and later to wheat and cattle, with pigs as a subsidiary industry dependent upon the maize crops of the arable land.

3. Consequently, the older grass-lands of Europe are devoted to mixed farming which tends to enforce first an importation of meat, and, as the population grows, of wheat as well.

4. The newer grass-lands near to Western Europe—Canada, United States—Russia, produce wheat and cattle ; while the newer lands in the southern hemisphere provide a preponderance of sheep, mutton and wool.

5. The United Kingdom imports about as much meat as she produces, about $4\frac{1}{2}$ times her wool crop and about 4 times her wheat crop. Meat comes mainly from the United States, Argentina, Canada, New Zealand and Denmark ; and wool mainly from Australasia.

✓ 12. Regions of Winter Rainfall.

1. Mark on an outline map of the world, by the initial letters of the products, the countries of production which are shown below.

Orange - - Spain, Italy, France, Algeria, Malta, California.

Lemon - - Spain, Italy, Sicily.

Lime - - Spain, Italy.

Citron - - Italy, Greece.

Figs - - Asia Minor (Smyrna), Greece, Portugal, Spain.

Grapes

(i) for wine - Italy, Spain, Portugal, France, Germany, Greece, Algeria,
Cape Colony, California, Australia.

(ii) raisins }
currants } Spain, Asia Minor, Greece, France, Italy.

Pear - - California, Cape Colony.

Peach - - California, Cape Colony.

Apricot - - California, France.

Walnut - - S. Europe.

Almond - - Italy, Morocco, Spain, France.

Millet - - Algeria, Spain, France, Austria-Hungary, Cape Colony,
California.

Barley - - California, Cape Colony, Algeria, Australia.

Winter rain regions.—The lands which lie on the polar edges of the hot deserts have been shown in Lesson 9 to have their rainfall during the winter season. This is due to the southward shifting of the cyclone tracks which occurs in that season, as shown in Lesson 8. In Valencia, Naples and Athens more

than 40 per cent. of the total annual fall occurs from October to December, while a similar percentage falls in Algiers and Tunis from December to February.

RAINFALL ON THE MEDITERRANEAN COASTS.

Month.	Valencia.	Naples.	Athens.	Algiers.	Tunis.
	in.	in.	in.	in.	in.
January - - -	1	3·5	2 8	4	3·5
February - - -	1	3·8	2	4	3·5
March - - -	1·5	3	2	4	2
April - - -	1·5	2·5	1 8	2	1·5
May - - -	1·5	1·5	1	2	0·5
June - - -	1	1·5	0 5	1	1
July - - -	0 5	0·5	0 5	—	0 5
August - - -	0 5	1 5	0·5	—	0 5
September - - -	3	2·5	0 5	1	1
October - - -	3 5	4·5	2 8	3	2
November - - -	2	5	3 8	4	2·5
December - - -	2	4 5	2·5	5	3

WINTER RAINFALL ELSEWHERE.

Month.	Cape Town.	Perth (W. A.).	San Francisco.
	in.	in.	in.
January - - -	1	—	5
February - - -	1	0·5	4
March - - -	1	1	3
April - - -	2	2	2
May - - -	4	5	1
June - - -	5	7	—
July - - -	4	6	—
August - - -	3	6	—
September - - -	2	3	—
October - - -	2	2	1
November - - -	1	1	3
December - - -	1	0·5	5

In San Francisco, Cape Town, and Perth (W.A.) a similar percentage falls in the months November-January or May-July
W.G. D

respectively. These areas mark the climax of a tendency towards a maximum rainfall in winter, which is noticed as one passes from the high latitudes towards the hot deserts. At the same time the skies become more cloudy. This marked preponderance of rain at the winter season is characterised by the term "Mediterranean climate."

✓ **Vegetation in winter rain regions.**—Since these areas lie between the deserts and the area of rain at all seasons, the vegetable products will gradually merge into those of the colder grass-lands; but where the winter rain is abundant and the summers dry, there occurs a characteristic vegetation, of which the main specimens are tabulated on p. 48. These are the coldest areas in which oranges, lemons, etc., can grow, since these fruits are sensitive to frost. Grapes grow in specially favoured districts in higher latitudes, but are most abundant in these areas. Peaches, pears, apricots, and almonds reach their greatest perfection in these areas, while millet and barley are widely distributed, though grown elsewhere.

In addition, the plants of these areas approximate to the desert plants in having thick skins, which prevent the evaporation of moisture from the surfaces of the plant during the hot days of summer; thus the Mediterranean is noted for its evergreens. Further away from the equator and on the elevated regions, the trees become first deciduous and later coniferous. A characteristic tree is the cedar, while the date palm flourishes in the warmer parts of these areas. The ease with which plants grow tends to make the inhabitants less enterprising and less active than the peoples who dwell in colder higher latitudes.

In certain parts, as Spain, Algeria, and California, the summer droughts make irrigation works compulsory.

SUMMARY.

1. The shore lands of the Mediterranean Sea are characterised by special rains in winter and a special vegetation.
2. Similar conditions prevail in California, Cape Colony, and the southern shores of Australia.
3. Winter rains occur almost entirely on coast lands.

QUESTIONS.

✓1. Name the great wheat-producing countries, and state their comparative advantages and disadvantages for the development of that industry. (U.A.)

2. Name, with their markets, the great meat-producing countries of the world, and state their relative advantages and disadvantages. (U.A.)

✓3. (a) What is meant by a Mediterranean climate? (b) Compare it with the monsoonal type. (c) What regions of the world belong respectively to these types? (d) What are the characteristic products of each? (U.A.)

✓4. Mention the chief areas from which Britain draws her wheat supply, and indicate in each case the routes and means by which it reaches Britain. (U.M.)

5. Explain clearly the origin of rain. Taking an Australian example, show what becomes of the rain which falls over any single river-basin. (U.M.)

✓6. Why does damp air deposit moisture both on crossing mountains and on passing northwards? Where is the zone of constant precipitation? Why is the western side of Europe so much warmer in winter than the eastern side of North America in the same latitude? (C.P.)

7. Explain carefully the difference in the season of rainfall on the Atlantic and Mediterranean coasts of Europe respectively. (M.U.)

8. Write a short account of (a) the situation, (b) the character, (c) the cause, (d) the economic importance of the grass-lands of Australia, *or* of those of Africa, *or* of those of North America. (Sc. L.C.)

9. What are the chief sheep producing areas of the southern hemisphere? How far is it climate that determines them? Are their exports identical? (L.C.C.)

10. Give an account of the woollen industry, naming the chief sources of supply and centres of manufacture. (L.C. Com.)

11. "Stock-farming will probably always be the most important occupation in large parts of the British Empire." State generally the position of some of the chief regions of which this is true, and explain the geographical conditions which are likely to prevent development in other directions. (O.U.L.)

12. Account for and show the importance of the typical features of a "Mediterranean" climate. (Newf.)

13. The Monsoon Regions.

1. Trace the two maps in Figs. 22 and 23; insert by means of arrow-heads the direction in which you would expect the winds to blow.

What conclusions do you draw as to the direction of the winds over the Indian Ocean?

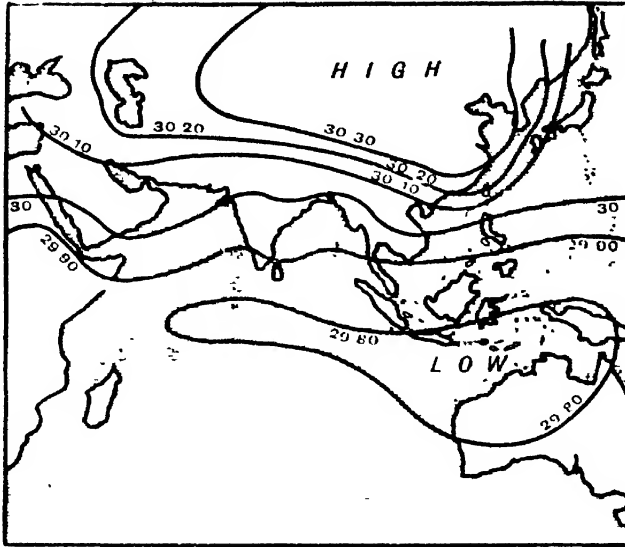


FIG. 22.—JANUARY ISOBARS. (After Buchan)

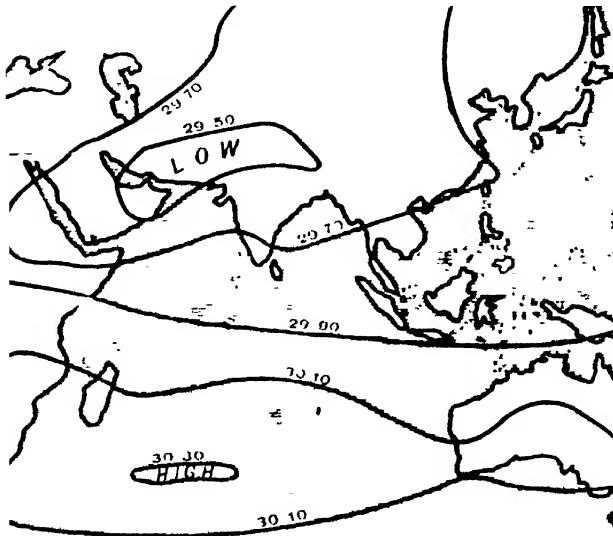


FIG. 23.—JULY ISOBARS. (After Buchan.)

- (b) Are there any trade-winds in the Indian Ocean?
- (c) At what season of the year could a ship sail from Madagascar to India without trimming its sails?
- (d) Make lists of those 'coasts which receive winds from the sea in

(i) January and (ii) July. Distinguish in each case whether the wind is blowing from a hot region to a cold region or *vice versa*.

✓(e), In the Indian Ocean area the land mass of Asia is opposed to a water mass south of the equator. What do you think are the results of this fact?

✓(f) The land mass of Australia is similarly opposed to a water mass on the other side of the equator; what are the results of this? Do these results confirm or contradict the results found in (e) above?

✓**The monsoons.**—In Lesson 9 special attention was directed to the seasonal rainfall of the Indian peninsula and the neighbouring lands. In the summer the North West corner of India becomes a centre of low pressure with winds swirling inwards round it in an anti-clockwise direction. This area affects Abyssinia, India, Burma, and South East China, and is responsible for the winds which blow over the Indian and China seas during the summer months. In Fig. 17 the special typhoon winds of the China Sea are shown, they are most frequent towards the end of the summer, following on the period when the South West monsoon is most marked.

Similarly, in its summer time, the wind blows on-shore on the coasts of Northern Australia, and produces similar seasonal rainfall.

INDIAN RAINFALL.

Month.	Bombay.	Calcutta.	Lahore.	Peshawur.	Madras.
	in.	in.	in.	in.	in.
January - - -	—	0·5	1	1 5	1
February - - -	—	1	1	1	—
March - - -	—	1 5	1	2	0 5
April - - -	—	2	0 5	2	0·5
May - - -	0 5	6	1	0 5	2
June - - -	21	12	2	—	2
July - - -	25	13	7	2	4
August - - -	15	14	5	2	5
September - -	11	10	2	0 5	5
October - - -	2	5	0 5	—	11
November - -	0·5	0·5	—	0·5	13
December - -	—	—	0 5	0·5	5

✓The rainfall in India shown in the above table is at a maximum during the summer months, June to September, on the western shores and inland from Calcutta up the valley of the Ganges; on

the Madras coast, however, the rain does not fall until the winds have changed. This coast is protected from the South West monsoon and has on-shore winds later in the year, in October-November, during the period of the North East monsoon.

OTHER MONSOON RAINS.

Month.	Lake Tsana (Abyssinia).	Port Darwin.	Canton.	Shanghai.
	in.	in.	in	in.
January - - -	0 5	15	2	2
February - - -	0 5	14	1 5	2
March - - -	0 5	11	3	4
April - - -	1	4	4	4
May - - -	2	1	8	4
June - - -	4	—	12	7
July - - -	8	—	9	5
August - - -	12	—	8	6
September - -	4	—	8	5
October - - -	2	2	2	3
November - -	0 5	5	1	2
December - -	0 5	11	1	1

In Abyssinia, the rain falls during the period of the South West monsoon, as is the case in South East China. Nearer the equator lies the region of tropical rains, but further south the rain falls at Port Darwin in North Australia during the summer months, November to March. The monsoon regions have heavy rains in summer and little rain in winter.

✓ **Monsoon rains and winter rains compared.**—On comparing the tables of monthly rainfall given for this and the last lesson, it becomes obvious that the rainfall in monsoon countries is much heavier during its period of maximum than in the countries which have a Mediterranean climate. This is further shown by the annual isohyets* for these regions, as the monsoon countries have an annual fall of over 40 inches, while the winter rain regions have only about half this quantity. At the same time, the monsoon lands have a much higher temperature, with the result that the vegetation of the two regions is quite distinct. This difference between the two kinds of vegetation is preserved by the hot deserts

* An isohyet shows for rainfall what isotherms show for temperature (Fig. 8).

which separate these areas from each other. Many plants which require warm temperatures in summer, such as the grape vine, will not grow in monsoon lands, owing to the excess of moisture. The vegetation of the monsoon lands merges into the vegetation of the purely tropical regions of almost constant rain. The typical monsoon plant is **rice**.

✓ **People in the monsoon lands.**—The ease with which life is supported in hot climates is typified in the case of the monsoon lands by the dense populations of India and China. The peasant is, however, entirely dependent upon the summer rain. If the monsoons destroy one crop, the abundance of water guarantees that a second crop will grow on the same land; he is thus guaranteed from starvation, provided the rains come; hence his whole agriculture hangs upon the “bursting” of the monsoon.

SUMMARY.

1. Monsoon lands are areas of heavy summer rains.
2. The rainfall is heavier than in regions of winter rains.
3. The rainfall and temperature maxima are coincident.
4. Vegetation merges into tropical types, and differs from the vegetation of Mediterranean climes.
5. Easy conditions of life make the monsoon lands densely populated.

14. Vegetable Products.

1. Sugar is produced from the root of the beet and from the sugar cane: the table gives some particulars as to the production in 100,000 tons.

SUGAR PRODUCTION.

Beet.				Cane.			
Germany	-	-	21	Foreign West Indies	-	-	13
Austria-Hungary	-	-	13	British do. do.	-	-	2
France	-	-	8	Java	-	-	11
Russia	-	-	12	India	-	-	20
Other countries	-	-	9	U.S. Empire	-	-	11
				Other countries	-	-	13
Total	-	-	63	Total	-	-	70

On an outline map of the world mark the main producing areas of cane sugar in one colour, and of beet sugar in another colour.

2. (a) The table below gives the quantities in million cwt. of the sugar imported from the various areas named :

BRITISH SUPPLIES OF SUGAR.

Germany	-	-	-	27	Java	-	-	-	-	1
Holland	-	-	-	4	British West Indies	-	-	-	-	1
Belgium	-	-	-	1	Others	-	-	-	-	6
France	-	-	-	3	Total	-	-	-	-	43

Mark these areas as sources of British supplies on the outline map of the last exercise.

(b) What do you notice as to the sugar Britons consume? what kind is it? whence does it come? What effect would it have on British consumption of sugar if the plantations of the British West Indian islands ceased to produce sugar?

3. The table gives the production of cotton in million tons.

COTTON PRODUCTION.

U.S.A.	-	-	-	-	26	China	-	-	-	-	0.3
India	-	-	-	-	08	Other countries	-	-	-	-	0.2
Egypt	-	-	-	-	03	Total	-	-	-	-	4.2

Mark on an outline map of the world these countries. What part of the United States is included in the "cotton belt"?

4. The table gives the supplies of the United Kingdom in million cwt.

BRITISH SUPPLIES OF COTTON.

U.S.A.	-	-	-	-	14	Other countries	-	-	-	-	1.5
Egypt	-	-	-	-	3	Total	-	-	-	-	19
British East Indies	-	-	-	-	05						

Mark arrow-heads on the map of the last exercise to show the countries which send cotton to Britain. Which countries send the larger part of their production to Britain?

TOBACCO PRODUCTION (million lbs.)

United States	-	-	-	-	717	Germany	-	-	-	-	70
India	-	-	-	-	450	France	-	-	-	-	45
Cuba	-	-	-	-	42	Brazil	-	-	-	-	53
Japan	-	-	-	-	113	Austria-Hungary	-	-	-	-	149
Russia	-	-	-	-	206	Other countries	-	-	-	-	212
Turkey	-	-	-	-	100	Total	-	-	-	-	2306
East Indies	-	-	-	-	149						

Tobacco.—This plant is a native of America, and requires a moist and warm climate. It is largely produced in the United

States, which supply Britain with about 90 per cent. of her needs. Germany both grows and imports tobacco; and the largest consumers are the countries of Western Europe and of the British Empire. The tobacco belt in the United States lies to the north and west of the cotton belt, and to the south and east of the wheat belt. In India and in Japan tobacco is grown in the same areas as tea. In France and Germany the main areas of growth are in the river valleys.

World production of coffee.—The table indicates the sources of the world's coffee in 1000 tons.

Brazil - - - -	900	Guatemala - - -	43
India and Ceylon - -	18	Arabia - - - -	6
Java - - - -	51	Other countries - -	40
Venezuela - - - -	24		
Colombia - - - -	42	Total - - - -	1124

Coffee.—The coffee plant is grown on hill sides in equatorial countries, the chief of which is Brazil, which grows sufficient to supply the world, the amount being about 80 per cent. of the total production. The chief consumers are the United States, then the countries of Western Europe, with the United Kingdom seventh among these, Germany and France consuming nine and five times the consumption in Britain. British supplies of coffee are obtained to the extent of one-fifth from India and Ceylon, slightly less than this amount from Brazil direct, and over 10 per cent. in each case re-exported from the United States and Germany.

✓ **Cane sugar.**—Sugar is obtained from a cane which grows to a height of about 12 feet in lands which lie within the tropics, and have a temperature never below 70 F. and a rainfall of at least 25 inches per annum. An acre of canes yields about a ton of sugar, and the plants, which are grown from cuttings, last about five years or more. The main supply is obtained from the West and East Indies, and amounts to about seven million tons per annum.

✓ **Other sources of sugar.**—During the nineteenth century sugar was extensively obtained from a root crop, the beet, in the temperate lands of Western Europe. At the present time the production is about six million tons per annum. The development of this European industry seriously affected the prosperity of the West Indian islands. In India a local sugar, jaggery, is obtained from certain palm trees, and in North America sugar is obtained

from the maple tree. There is a small export trade in both these varieties.

✓**The trade in sugar.**—The most important consumers of sugar are the countries of Western Europe (the most important of these the United Kingdom) the United States, and the Australasian Colonies. Britain obtains her supplies mainly from the beet fields of Germany and France, and to a smaller extent from the West Indies. The United States produces both beet and cane sugar, yet her imports of this commodity are the most valuable of all her imports. This latter fact is due to her proximity to the supplies of the West Indies. The sugar trade has an important by-product in molasses.

✓**Cotton.**—This plant is grown in countries where the temperature range is $60^{\circ} \pm 12^{\circ}$ F. and the mean temperature is $71^{\circ} \pm 6$ F. Extremes of temperature and excess of rainfall or water supply are both injurious. About two-thirds of the world's cotton is grown in the United States, and the variety which is grown to a small extent only in the south-east, known as **sea-island cotton**, is the premier quality. The United States supplies about nine-tenths of the cotton consumed in the great manufacturing countries, and sends to Britain about three-fourths of her supplies. The dependence of Britain upon the United States, and the fact that cotton manufacturing is on the increase in that country, has forced the British manufacturer of South-east Lancashire to stimulate cotton growing within the Empire, and improvements in the cotton of Egypt and India, together with the growing of cotton on the suitable lands of the Sudan and Queensland will result. British imports of cotton are, after the imports of grain and flour, the most valuable import, and about 14 per cent. of the imports are re-exported. **Cotton-seed oil** forms an important by-product, and is used in making salad oil, butterine, lard, soap.

✓**World production of rice.**—The table below gives the production of rice in million tons.

China	-	-	-	-	25	Japan	-	-	-	-	8
India	-	-	-	-	30	Indo-China (French)	-	-	-	-	2
Java	-	-	-	-	3	Siam	-	-	-	-	3
Other countries	-	-	-	-	3	Total	-	-	-	-	74

✓**Rice.**—This important cereal requires large supplies of water during certain periods of its growth, and at other times a dry soil; consequently the **paddy** fields are found in the alluvial flats

of valley bottoms of the hotter parts of Asia. A noteworthy extension of its area of production is taking place in Texas and Louisiana. The plant requires a high temperature, and grows best where there is a plentiful rainfall at certain seasons - monsoon countries although the variation in water supply is sometimes attained artificially by irrigation. Thus, rice is best grown in the great deltas of tropical rivers, and consequently in the midst of a great population. This latter fact explains why rice does not occupy a great part in the world's trade, since there is no great surplus for export.

Britain's imports of rice.—The table below gives the imports of rice into the United Kingdom in million cwt.

Burma - - - -	35	Siam - - - -	02
India - - - -	1	Other countries - - -	02
Germany - - - -	03	Total - - - -	58
Holland - - - -	06		

Burma, *via* Rangoon, supplies Europe generally and Britain in particular, since in this area the population is less dense.

World production of tea.—The table gives the value of the production of tea in £100,000.

India - - - -	58	Java - - - -	4
China - - - -	55	Other countries - - -	5
Ceylon - - - -	34	Total - - - -	161
Japan - - - -	5		

Tea.—This plant requires a rainfall of about 60 inches per annum, distributed evenly throughout the year. Consequently, although grown in the monsoon lands, the area of growth is limited to those regions where the seasonal distribution of the rain is the least marked.

British supplies of tea.—(a) The following table indicates the quantities of tea imported from the places named: the amounts are in million lbs.

Holland - - - -	17	Ceylon - - - -	107
China, Hong Kong - -	17	Other countries - - -	4
India - - - -	175	Total - - - -	320

Britain is the largest consumer of tea, and her supplies come mainly from India and Ceylon. Australasia and Canada also

consume large quantities per head of the population, although the total consumption in these colonies is only one-sixth and one-twelfth respectively of that of the mother country. Holland, Russia, the United States and Norway all consume about the same quantity per head, but the population makes the total imports of small importance, except in Russia and the United States, to which countries the supply is about 68 per cent. and 40 per cent. of the amount imported by Britain.

✓ SUMMARY.

Product.	Climate.	Producers.	Consumers.
Tobacco	Moist, warm	U.S.A., Germany, East and West Indies	U.S.A., Western Europe
Coffee	Upland, in tropics	Brazil	U.S.A., Western Europe
Sugar (cane)	Tropical	East and West Indies	{ Western Europe, U.S.A., British Empire
do. (beet)	Temperate	Western Europe	
Cotton	Equable, though fairly hot and fairly dry	U.S.A., Egypt, India	Britain
Rice	Monsoon low-land	China, India	Where grown
Tea	Monsoon upland	India, China, Ceylon	Britain

✓ 15. Coal and Iron.

1. Consider Fig. 24. Along which parallels of latitude is the earth's crust newer than carboniferous at the surface? There are three more or less north and south lines of surface rock older than carboniferous, ending at Cape Horn, the Cape of Good Hope, and Tasmania. Write out fully the direction of these three lines. Along which belt of land, east and west, is most of the surface rock older than carboniferous?

2. Consider Figs. 24 and 25 together. In which countries is it still possible that coal might be found? Why do Brazil, Chile, and South Africa import coal? Explain the coal imports of Mexico and Western Australia. In what rocks is iron ore found?

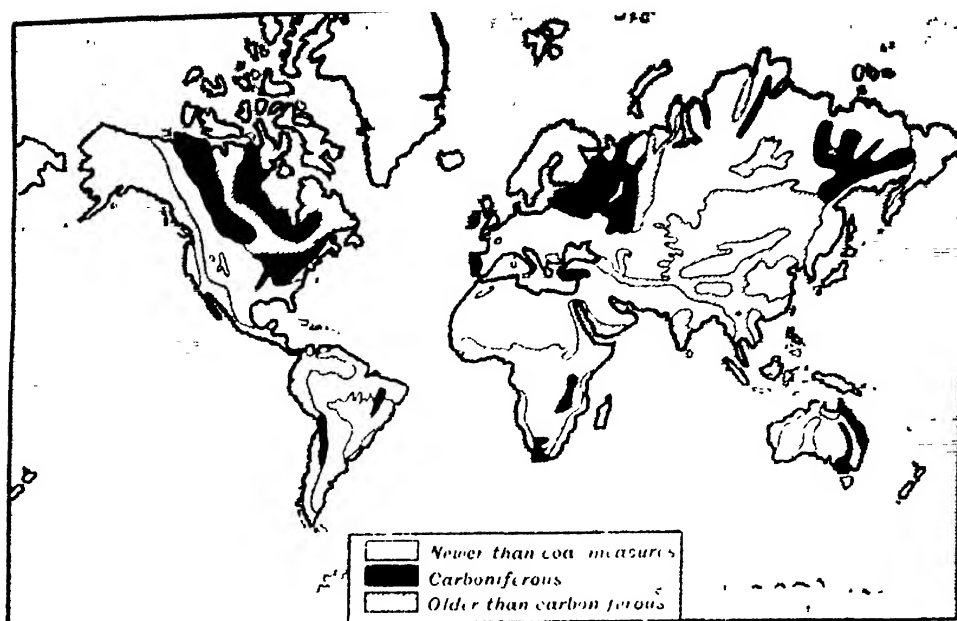


FIG. 24.—THE WORLD'S ROCKS.

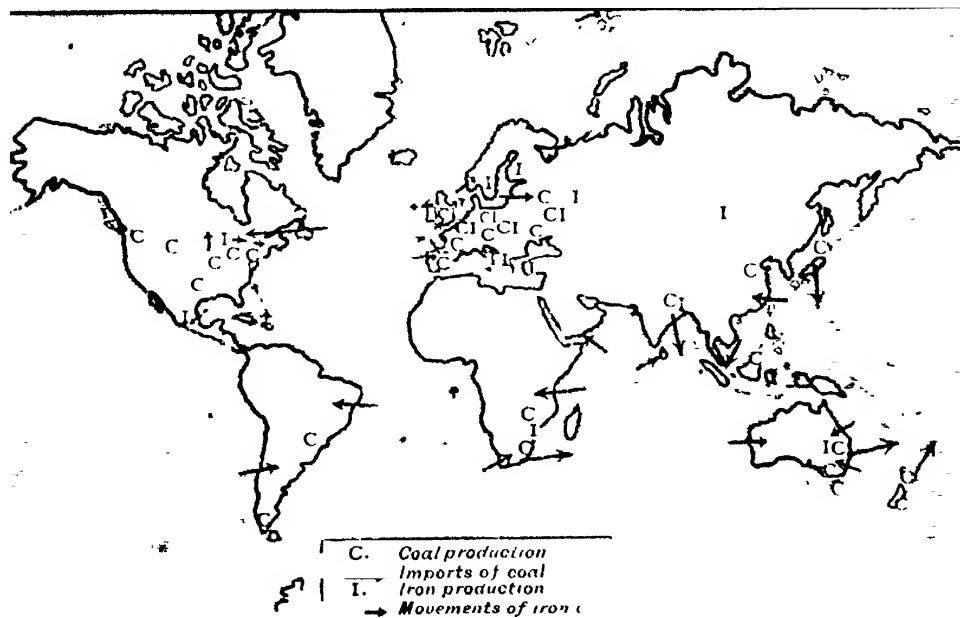


FIG. 25.—COAL AND IRON PRODUCTION.

PRODUCTION OF COAL AND IRON.

	COAL, in million tons.	IRON.		
		Iron Ore in million tons.	Pig iron in million tons.	Steel in million tons.
United Kingdom - - -	263	16	10	6
United States - - -	400	44	21	19
France - - -	35	9	3	2
Belgium - - -	24		1	2
Germany - - -	205	27	12	11
Spain - - -	4	10	--	--
Sweden - - -	--	5	1	--
Russia - - -	22	5	3	2
Australia - - -	9	--	--	--
New Zealand - - -	2	--	--	--
British South Africa - -	4	--	--	--
Canada - - -	9	--	1	1
India - - -	10	--	--	--
Japan - - -	13	--	--	--
Others - - -	50	8	3	2
Totals - - -	1050	124	55	45

Coal mining and trade.—Coal occurs in certain classes of rocks which belong to the Carboniferous series. Although it occurs elsewhere and is mined frequently where it is found, the chief coal mines of commercial importance are in countries which border the North Atlantic Ocean. In these lands the coal is situated sufficiently near the surface, and near the sea or other navigable waterways, for the industry to be carried on profitably. In parts of China and in Spitzbergen coal seams occur actually at the surface, and the expenses of mining are therefore slight; but the cost of transporting this heavy commodity to the markets prohibits any coal from being mined. Until recently, Britain was the premier coal producer, but the development of the natural resources of the United States has placed that country first in this respect. Germany produces almost as much as the United Kingdom, so that Western Europe has a greater production of coal than the United States.

BRITAIN'S EXPORTS OF COAL IN MILLION TONS.

To		To	
France - - - -	10	Holland - - - -	3
Germany - - - -	9	Brazil - - - -	1
Italy - - - -	8	Norway - - - -	2
Sweden - - - -	4	Portugal - - - -	1
Spain - - - -	2	Belgium - - - -	1
Argentina - - - -	2	Algeria - - - -	1
Egypt - - - -	3	Other countries - - - -	7
Russia - - - -	3	Total - - - -	<u>60</u>
Denmark - - - -	3		

British coal, to the extent of about 65 per cent., is exported to countries which border the Atlantic Ocean. Few British colliers pass out of this ocean, except to replenish at the coaling stations the stocks of steam coal for the British Navy. This export of coal provides Britain's mercantile marine with a cargo on the outward voyage, and the imports of food-stuffs and raw material for manufactures provide the return cargo, thus reducing freights and stimulating trade.

Iron mining.—The United States are the premier iron-ore producer. Germany mines the second largest amount, and Britain is third. The iron supplies of Sweden and Spain are important. Little iron is mined away from the North Atlantic coast lands.

Iron manufactures.—The manufacture of iron goods necessitates the smelting of the iron-ore with the aid of coal, and thus the fact that Spain and Sweden are not great coal producers forces these countries to export their ores; and at the same time this necessity limits the iron manufactories of the world to the five countries, United States, Germany, United Kingdom, France, and Russia.* These countries supply iron work for the rest of the world, and the transport of the heavy articles helps to provide outward cargoes for merchant ships.

SUMMARY.

1. Coal and iron mining are practically limited to five countries in the northern hemisphere.
2. These countries make practically all the iron goods.
3. Spain and Sweden export iron ore.
4. Britain supplies coal to the coast lands of the Atlantic Ocean.

✓16. The World's Ocean Trade Routes.

1. Examine Fig. 26. Identify the ports marked on the map. The two tracks across the Atlantic Ocean used in winter and summer are distinguished: why are two tracks used? Why is there little ocean traffic above latitude 50° N.? Why are the most frequently used tracks those in the North Atlantic Ocean?

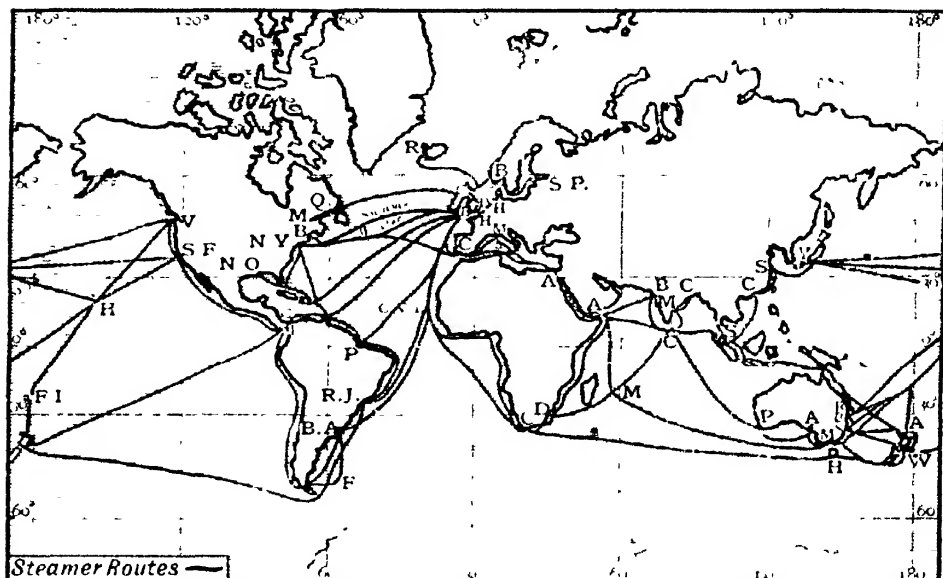


FIG. 26.—THE WORLD'S OCEAN TRADE ROUTES.

2. Distinguish three routes whereby a steamer could go from Australia to Britain. Which route is practically useless for sailing vessels? What canal is responsible for this? What effect do you think the opening of the Panama Canal will have upon the routes from Britain to Australia?

3. Find, from the advertisements of the steamship companies, the time taken to journey from the great ports of your own land to other great ports. Tabulate these times.

The North Atlantic Ocean.—The traffic of the world consists in supplying the United States and Western Europe with raw materials for manufacture and food-stuffs, and in obtaining manufactured articles from Western Europe and Eastern United States. Consequently the North Atlantic Ocean is traversed by ocean-going ships more frequently than any other ocean. The ships enter this

part of the ocean by means of the Strait of Gibraltar, or by means of the entry near the Cape Verde islands. Although the ocean is open, especially during the summer months, there is comparatively little traffic towards the north owing to the difficulty attendant upon the navigation round both Eurasia and North America. Ships have been forced through these North West and North East passages, as they are called, but this feat occurs so infrequently that the successful issue into the Pacific through Bering Strait is chronicled as a feat of Arctic exploration or navigation.

The Southern Oceans.—The oceans towards the south are, however, more open, and thus sailing vessels and steamers can pass round the Cape of Good Hope and Cape Horn. The prevalent westerly winds—the **roaring forties**—tend to make ships take a course round these capes from the west to the east, and the passage round Cape Horn from the Atlantic to the Pacific is so difficult that in some cases ships turn back unsuccessful.

The Indian Ocean.—The eastern coast lands of the Indian Ocean are the source of much raw material and food-stuffs, and consequently the great ocean tracks are frequently traversed by ships which have their terminal ports somewhere on these coasts. The most important entry into the Indian Ocean is from the Red Sea, which, since the Suez Canal was cut, has become like the Mediterranean Sea, a passage way for steam-ships. This canal has caused the Indian Ocean to be traversed by ships *en route* to China, Japan, and Australasia, and thus Mauritius, Colombo, and Singapore have become junctions on the ocean routes, and therefore important coaling stations.

The Pacific Ocean.—The routes across the Pacific Ocean start from Japan or Australasia, and the crossing of the tracks from these places to North America has made junctions of the Fiji Islands and Honolulu.

The concentration of traffic towards the Northern Hemisphere.—One important result of the concentration of traffic towards the coast lands of the North Atlantic Ocean has been to facilitate the construction of the great trans-continental railway lines. The railway route across Europe from Calais to Brindisi, that across Eurasia from Germany to Port Arthur (the Trans-Siberian railway route), those across North America, both in Canada and the United States, are all affected by the position of the great terminal ports on the ocean highways. At the same time, the stimulus towards the construction of the Panama Canal

and the Trans-Andean railways is due to the fact that the voyage round Cape Horn is always a detour which ships avoid whenever possible.

SUMMARY.

1. The ocean highways have been determined by the development of traffic to and from Western Europe and Eastern United States.
2. This fact has caused certain great ports to be junctions and "supply" stations; while other great ports have become termini.
3. London is conveniently situated for ocean traffic, it thus acts as an entrepôt for the traffic which finds London at the end of a long ocean journey. Singapore is similarly placed.
4. The inclement weather met on an ocean voyage north of latitude 50 N. keeps ocean traffic south of that parallel.
5. The roaring forties affect the direction of traffic in the southern oceans. The Suez Canal determines at present the direction of fast traffic from Europe to the Pacific coasts.
6. The great trans-continental railway lines terminate at the termini of ocean routes.

17. The British Empire.

1. Make a list of the countries which form the British Empire.
2. Make a table showing the larger land masses of the Empire, and state for each the great natural vegetation regions which it contains.
3. From a map showing areas correctly, by means of tracings on squared transparent paper, estimate roughly what fraction of the earth's land surface is contained within the Empire. What single countries are larger than Australia and Canada?
4. What great terminal ports of the ocean highways lie outside the Empire? Which of the great junctions on the ocean highways are within the Empire?
5. Britain depends upon supplies of raw material and food stuffs for her prosperity. Make a table to show which parts of the world supply Britain with these necessities, distinguishing between those within and those without the Empire.

The extent of the British Empire.—There are parts of the British Empire in each of the continents. From the tiny Imperial outpost at Gibraltar to Canada, which forms roughly half of the land mass of North America, to practically the whole of the land in the water hemisphere ranges an unbroken series of regions knit by the Imperial sentiment and the Empire's flag. Even the cold areas of Antarctica bear record in the names of members of the Royal Family which are used for the better known portions to the widespread nature of this greatest of modern empires.

The peoples of the Empire.—White men in Canada and Australasia, yellow men in India, black men in Africa; farmers in the Canadian west, manufacturers in the homeland, hunters in the barrens of Labrador, fishers in Newfoundland; all these show the manifold constitution and occupations within the Empire.

Climates in the Empire.—The British Empire is so widespread that each form of climate is typified in some part of it. There are the tropical rainfalls of the West Indies and West Africa; the monsoon lands of India and Burma; the winter rain regions of South Africa and Southern Australia; the summer rain regions of the Anglo-Egyptian Sudan and Rhodesia; the hot deserts of Central Australia and North West India, and the variable temperate climate of Canada.

Vegetation regions in the Empire.—The tundra of Canada, the temperate forests and the grass-lands of the same colony; the grass-lands of Australasia; the tropical forests of Burma and West Africa, include specimens of the great world vegetation types. The Empire thus contains within it the possibility of the production of nearly all kinds of vegetation which is required for the world's work.

Imperial ocean highways. Colombo, Singapore, etc., are Imperial ports which are junctions. Calcutta, Sydney and Wellington, etc., are Imperial termini on the great ocean routes. The concentration of traffic from the outliers of Empire to the mother country makes no small part of the traffic which converges upon the North Atlantic Ocean.

SUMMARY.

The British Empire epitomises the world.

QUESTIONS ON PART I.

1. Point out the connection between areas of high and of low pressure and the direction of the wind. What influence has the rotation of the earth on winds? In what direction do winds blow that are most altered in direction thereby? (C.P.)

2. "The winter climate of the British Isles is more temperate than is justified by its latitude." Enumerate briefly the causes of this. How does this anomalous climate affect the products of these islands and the industries of the people? What other insular areas with approximately the same latitude lack this anomalous climate? (C.S.C.)

3. Describe as fully as you can the monsoon winds of S.E. Asia and their causes. (I.C.C.)

4. Explain why places in the monsoon region usually receive most of their rainfall during the summer. (O.U.L.)

5. What is meant by a monsoon wind? Describe in particular the conditions of temperature, pressure and rainfall during the summer monsoon in the Indian area. (M.U.)

6. In what parts of the world do we find autumn and winter rains prevailing? Give what explanation you can. (M.U.)

7. Describe the meteorological conditions, relief, biological features, and distribution of the great deserts and account for their position. (B.U.)

8. Describe the vegetation of (a) tundra, (b) steppes, and describe the conditions of life of the inhabitants. Where are such districts to be found? (C.P.)

9. Explain the blank spaces in the table on p. 60: e.g. why is there no wheat production in Norway and Finland? or why does the United Kingdom produce little rye and no maize?

10. On an outline map of the world mark from the table of cereal production the countries furthest north and furthest south which grow each cereal. From this map tabulate for each cereal:

- (i) The limits of growth, both north and south.
- (ii) The midsummer temperatures at these limits.
- (iii) The total rainfall at these limits.

11. Australia and New Zealand compete with Argentina as providers of food stuffs: make a detailed comparison of the relative importance of these areas as cereal growers.

12. When the United States ceases to export cereals, what countries should supply the United Kingdom?

13. Explain the blanks in the table on pp. 70-1: e.g. Why are there no sheep in Nicaragua and Honduras, or why are there no pigs in Turkey?

WORLD PRODUCTION OF CERFALS IN MILLION BUSHELS.

	Wheat.	Oats.	Barley.	Rye	Maize.
United Kingdom	57	178	65	2	—
Germany	133	505	143	357	—
France	330	300	40	48	21
Russian Empire	570	927	346	805	50
Austria-Hungary	223	231	135	129	186
Belgium	14	43	4	20	—
Bulgaria	31	9	10	5	17
Italy	164	18	8	4	91
Denmark	4	50	23	17	—
Netherlands	5	22	4	13	—
Norway	—	6	2	1	—
Finland	—	22	5	11	—
Sweden	6	77	15	22	—
Servia	11	3	3	1	19
Spain	116	24	60	25	20
Roumania	68	21	22	4	60
Portugal	7	—	—	—	13
Greece	8	—	—	—	—
Switzerland	4	—	—	—	—
Turkish Empire	57	—	—	—	—
Japan	20	—	45	35	—
Persia	16	—	—	—	—
British India	285	—	—	—	16
Cyprus	2	—	3	—	—
Canada	110	259	47	3	24
Mexico	9	—	7	—	80
United States	672	800	160	30	2604
Tunis	6	3	9	—	—
Algeria	29	8	38	—	—
Egypt	25	—	—	—	31
Anglo-Egyptian Sudan	1	—	—	—	—
Total, Northern Hemisphere	2908	3569	1203	1572	3322
Argentina	152	—	—	—	146
Chile	15	—	—	—	1
Uruguay	6	—	—	—	4
British South Africa	3	3	1	—	10
Australia	60	11	2	—	9
New Zealand	7	19	1	—	1
Total, Southern Hemisphere	242	29	4	—	170
Grand Total	3241	3602	1207	1572	3492

ANIMALS ON THE GRASS-LANDS IN MILLIONS.

	Horses.	Sheep.	Pigs.	Cattle.	Percentage Dairy Cattle † of Total.
United Kingdom	2.2	30.0	3.8	11.7	33
Germany	4.4	7.7	22.2	20.6	50
France	3.2	17.5	7.1	14.1	53
Russian Empire	30.7	69.1*	13.0	40.6	
Austria-Hungary	3.9	10.7	10.1	16.1	47
Belgium	0.3	0.2	1.2	1.8	50
Bulgaria	0.5	8.1	0.5	1.8	25
Italy	1.0	11.2	2.5	6.0	
Denmark	0.5	0.9	1.5	1.8	60
Netherlands	0.3	0.9	1.3	2.0	60
Norway	0.2	1.4	0.3	1.0	70
Finland	0.3	1.0	0.2	1.5	70
Sweden	0.6	1.0	0.9	2.6	70
Servia	0.2	3.2	1.0	1.0	20
Spain	0.5	14.5	2.1	2.3	
Roumania	0.9	5.7	1.7	2.6	16
Portugal	0.1	3.1	1.2	0.8	
Greece	0.2	4.6	0.1	0.4	
Switzerland	0.1	9.2	0.5	1.5	53
Turkish Empire	1.4	55.0		4.0	8
Japanese Empire	1.5		0.3	1.3	
British India	1.5	21.5		116.7	29
Ceylon		0.1	0.1	1.6	
Cyprus	0.1	0.3		0.1	
Dutch East Indies	0.5			3.1	
Philippine Islands	0.1		1.2	0.1	
Siam				1.1	
Mexico	0.9	3.4	0.6	5.1	
United States	20.7	56.1	56.0	71.2	31
Canada	2.0	2.0	3.2	7.3	38
British West Indies				0.1	
Cuba	0.5		0.4	2.9	50
Guatemala	0.1	0.1		0.2	
Honduras			0.1	0.6	
Nicaragua				1.2	
Costa Rica	0.1		0.1	0.3	33
Tunis		0.6		0.2	
Algeria	0.2	9.3	0.1	1.1	
Egypt	0.1			0.7	
Anglo-Egyptian Sudan		1.4		0.3	
British East Africa		2.1		0.3	
Total: Northern Hemisphere	80.5	343.8	133.3	356.7	

* Including goats.

† The figures are given where information is available.

ANIMALS ON THE GRASS-LANDS IN MILLIONS—*Continued.*

	Horses	Sheep.	Pigs.	Cattle.	Percentage Dairy Cattle † of Total.
Argentina - - - -	7 5	67 2	1 4	29 1	—
Chile - - - -	0 5	2 4	0 2	2 3	4
Uruguay - - - -	0 6	18 6	0 2	8 2	—
Brazil - - - -	—	—	—	30 0	—
Paraguay - - - -	0 2	0 2	—	2 3	—
Falkland Islands - -	—	0 7	—	—	—
British South Africa -	0 4	28 0	0 5	3 5	25
Madagascar - - -	—	0 3	0 5	2 9	40
Australia - - - -	1 8	81 9	0 9	9 4	16
New Zealand - - - -	0 4	21 0	0 2	1 8	28
Total : Southern Hemisphere	11 4	229 8	3 9	89 9	—
Grand Total - - - -	91 9	573 6	137 2	446 6	—

† The figures are given where information is available.

14. Argentina competes with Australia and New Zealand in providing meat and wool—tabulate the relative importance of these areas as rearers of sheep and cattle.

15. Make a list of the countries where it is known that at least half the cattle are kept for dairying: where are these countries? Why do they excel in dairying?

16. When the United States has little or no surplus meat to export which countries would you expect to supply the needs of Western Europe?

17. Regarding the earth as a whole, what circumstance is of primary importance in determining the climate for particular localities? Give reasons for your answer. (Auck. U.)

✓ **18.** Mention the main ocean trade routes between Australia and Europe, and compare their respective advantages. (U.A.)

19. What causes the wind? Explain what is meant by land breeze, isolars, anticyclone, monsoon, the Fohn effect. What is the composition of the atmosphere? (U.A.)

20. Explain on astronomical grounds why the month of January in Australia is hotter than July? What causes the prevalent winds of the world? (U.A.)

✓ **21.** Compare and contrast the Atlantic and Pacific Oceans with respect to their coast lines and islands. (U.M.)

22. Draw a rough outline map of the world on Mercator's projection, and indicate on it the chief British possessions and dependencies. Name the various capitals. (U.M.)

✓23. Show on a rough sketch map the trade route by which goods are usually sent from New York to Melbourne. Mark on the sketch map the chief ports of the route. (U.M.)

✓24. Name the chief dependencies of the British Empire, and give their situation and the capital of each. (N.Scot.)

✓25. "Europe has a milder climate than any other part of the world at the same distance from the equator." Account for this condition. (N.Scot.)

26. What parts of Asia are desert? Why? Are any parts of the desert area cultivated? What is necessary for this cultivation? How is it obtained? Describe the characteristics of an oasis. (L.U.)

✓27. Name the most important British possessions in the West Indies, in Africa, in South America, in Asia. (Br.Col.)

✓28. Were I to travel by sea from London to Hong Kong, what places would I visit? Should I have to touch at every British possession in the course of my journey? (P.E.I.)

✓29. (a) By what three routes might one travel from London (England) to Melbourne (Australia)? Define each in detail. (b) Which route do you consider preferable for commercial purposes, and why? (Ont.)

30. What parts of a man's clothing are usually made of wool? Whence would a West Riding manufacturer obtain his supplies of raw material, and by what routes? To what countries does England chiefly export manufactured wool? How is it that England re-exports nearly half the raw wool that she imports? (C.S.C.)

31. A ship can sail before the wind from (a) Norway to Scotland, (b) Portugal to S. America, (c) Africa to India. State at what season this is possible in each case, giving reasons for your answer. (L.C.C.)

32. In what parts of the world do permanent winds blow? Explain their causes. (L.C.C.)

33. Show how it is possible to take a voyage round the world without touching at any land not part of the British Empire. (L.C.Com.)

What are the chief transatlantic trade routes? (L.C.Com.)

What are the chief regions where tea is grown? Give in each case the countries to which it is mainly exported. (L.C.Com.)

✓36. What special differences are observed in the vegetation (a) in temperate lands with a rainfall fairly equally distributed over the year, (b) in temperate lands with dry summers and winter rains, (c) in the equatorial rain belt? What are the chief food plants in these regions? (C.P.)

PART II.

THE BRITISH EMPIRE AND THE REST OF THE WORLD.

18. Introductory.

Many of the facts which are essential to the proper conception of any portion of the earth's surface can be obtained direct from the maps usually published in atlases. The methods by which this can be done are shown in detail below.

A. THE SIZE OF A COUNTRY.

(a) *Areas.*—The area of a small portion of the earth's surface can be obtained from an atlas by means of squared transparent paper, as shown on p. 8. This is done on the ordinary map, but, when the country to be measured is large, a map showing areas without distortion, such as that of Fig. 5, must be used.

(b) *Dimensions.*—(i) *Along meridians.* The distance along one or two selected meridians should be read from the atlas in degrees, and this value multiplied by 70 gives the dimension in miles.

(ii) *Along parallels.* The distance along one or two selected parallels should be read in degrees, and the value thus obtained should be multiplied by the corresponding distance in miles per degree, as shown in the table below.

TABLE OF MILES PER DEGREE ALONG PARALLELS OF LATITUDE.

Parallel.	Miles per Degree.	Parallel.	Miles per Degree.
0	70	50	45
5	69	55	40
10	68	60	35
15	67	65	30
20	66	70	24
25	63	75	18
30	61	80	12
35	58	85	6
40	54	90	0
45	49		

Example.—India. Along lat. 15° N..... $80^{\circ} - 74^{\circ} = 6$ degrees.

$$6 \times 67 = 402.$$

Width = 400 miles (approx.).

Along lat. 25° N..... $98^{\circ} - 67^{\circ} = 32$ degrees.

$$32 \times 63 = 2016.$$

Width = 2,000 miles (approx.).

(iii) *Cross distances.* These distances should be measured on the globe. Cut a piece of cardboard into a rectangle; cut from this a semicircular piece which just fits the globe. Mark the semicircle in degrees. Use the cardboard to measure the distance from place to place in degrees, which are equivalent to degrees along a meridian. Multiply the value found by 70 to obtain the distance in miles.

Example.—Melbourne to Brisbane. Distance along scale of cardboard 14 degrees. Distance in miles = $14 \times 70 = 980$.

The results obtained should be entered in a record book in a table, so as to bring similar measurements together.

Country measured	Area, Sq. Mls.	DIMENSIONS.					
		(i) Along long	Miles	(ii) Along lat.	Miles	(iii) Cross distance.	Miles
Wales	7,400						
India				15° N.	400		
				25° N.	2000		
France	..	0°	230	
Australia					...	Melbourne to Brisbane	1000

B. THE RELIEF OF A COUNTRY.

(i) *Lowland, upland, mountain.*—Assume that land below 600 feet above sea-level is lowland, land between 600 and 6000 feet above sea-level is upland, and land over 6000 is mountain. Examine a relief map of the country which shows contours, and estimate the percentage of the country which falls into these three categories.

Example.—India. Lowland, 40 per cent.; upland, 57 per cent.; mountain, 3 per cent.

(ii) *Gradient.* From a relief map showing contours, one or more typical sections should be made across the country, as shown in Fig. 65. The gradient, or slope, should be shown on these, especially from the coast inland.

The results should be tabulated.

Country.	Percentages (estimated).			Gradient from coast at :
	Lowland.	Upland.	Mountain.	
India	40	57	3

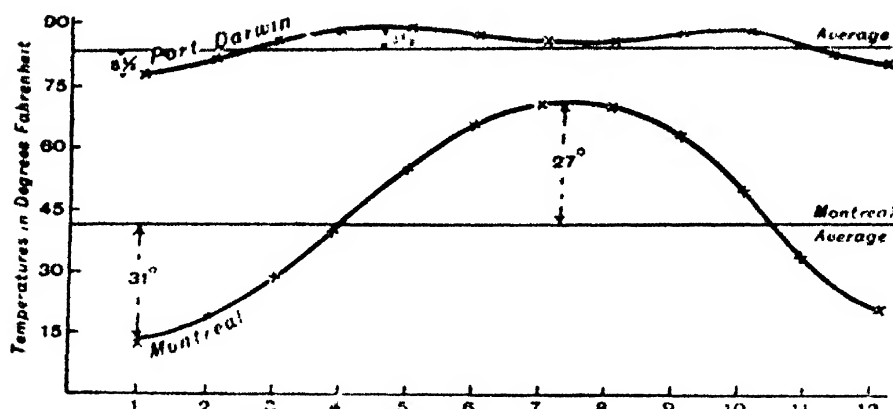


FIG. 27.—TEMPERATURE CONTRASTS.

C. THE CLIMATE OF A COUNTRY.

(i) The *mean monthly temperatures* for certain towns are given or are read from monthly temperature maps as in the following table. These are plotted as in Fig. 27, numbering the mid-winter month 1 and the following months 2, 3, etc.

Month.	Temperature in Degrees F.		Month	Temperature in Degrees F.	
	Montreal.	Port Darwin.		Montreal.	Port Darwin.
1	12	78	7	70	84
2	16	80	8	69	84
3	25	85	9	61	85
4	40	86	10	48	86
5	55	87	11	34	82
6	65	86	12	18	79

The average temperature for the year is shown by horizontal lines as in Fig. 27, and the variation in temperature is entered as follows :

Montreal - - - 43, + 27, - 31.
 Port Darwin - - - 83½, + 3½, - 5½.

The average temperature rise and fall being Montreal 5 degrees a month, and Port Darwin under 1 degree a month.

(ii) *Mean monthly pressures* are similarly treated. The pressures shown in Fig. 96 yield the following results :

Reykjavik - - - 29.73, +0.20, -0.23.

Halifax - - - 29.95, +0.08, -0.07.

(iii) *Rainfall*.— In addition to the average annual rainfall and the variations from this average, it is advisable to obtain the percentages of rainfall in the seasons. The results should be tabulated as below ; the facts being derived from the tables on p. 49.

Place.	Rainfall.		Percentages.			
	Average in inches.	Variation in inches.	(i) Winter.	(ii) Spring.	(iii) Autumn.	(iv) Summer.
Naples -	30	+ 1.5, - 2.5	35	20	10	35
Cape Town -	30	+ 3.0, - 2.5	44	22	7	27

At the same time, it is necessary to record from the climate maps what parts of the country have more than 20 inches of rain per annum, and also what parts have more than 50 inches of rain during the year.

D. THE VEGETATION REGIONS OF A COUNTRY.

Having determined the facts with regard to elevation and climate it is necessary to tabulate the parts of the country which belong to the great natural vegetation regions. The table below is suggested.

Country.	Tundra.	Temperate Forest.	Grass lands.		Desert.	Tropical Forest.
			(i) Pure	(ii) Mixed with woods.		
Canada	Northern shores	On Laurentian heights	Manitoba, etc.	Ontario	none	none

E. POPULATION.

In the record book make squares one inch each side and place in each square as many dots as there are people per square mile in each country. Make a table of the population of the large cities as below :

POPULATION OF CITIES. TOWNS HAVING :

Country:	(i) Over 1,000,000 people.	(ii) 500,000 to 1,000,000.	(iii) 250,000 to 500,000.	(iv) 100,000 to 250,000.
India	none	Calcutta, Bombay, Madras •	Haidarabad, Lucknow	Rangoon, Benares, Delhi, Lahore, Cawnpore, Agra, Ahmenadabad, Mandalay, Allahabad, Amritsar, Jaipur, Ban- galore, Poona, Patna, Nagpur, Srinagar, Surat, Karachi, Trichi- nopoly, Baroda.

SECTION I. AUSTRALASIA.

19. The Continent of Australia.

1. Enter in the record book details as to the area of Australia. Measure the dimensions along meridians 120° E., 130° E., and 145° E.; and along parallels 30° S., $23\frac{1}{2}^{\circ}$ S., and 15° S. Tabulate the distances from Melbourne to Sydney, Brisbane, Adelaide, Perth, and Hobart.

2. Find the distance from Sydney to Cape Maria van Diemen (N.Z.).

3. Find the distance from Perth to Durban.

4. In Australia the five States are separated from each other sometimes by natural, sometimes by artificial boundaries: tabulate each kind.

5. Enter in the record book the percentages of lowland, upland, and mountain.

Position. -- Australia lies in the ocean hemisphere, out of the track of ships which are not aiming at reaching that continent; consequently the continent was, with the exception of Antarctica, the last discovered. Its nearest neighbours, except the East Indian Islands on the north, are many miles away, and thus isolation characterises the continent. •

Size. -- The area of the continent is a little less than that of Europe; its shape is roughly elliptical with the projections of Arnhem Land and Cape York Peninsula balancing the Great Australian Bight. The greater axis is about 2,500 miles and the smaller axis about 1,500 miles in length.

The proportionate sizes and populations of the various States are shown in the table below. Of the States of Victoria and New South Wales the former has the denser population, although the latter has the larger number of inhabitants. The total population

is less than that of London, and the population of Queensland is about the same as that of Glasgow, or Sydney.

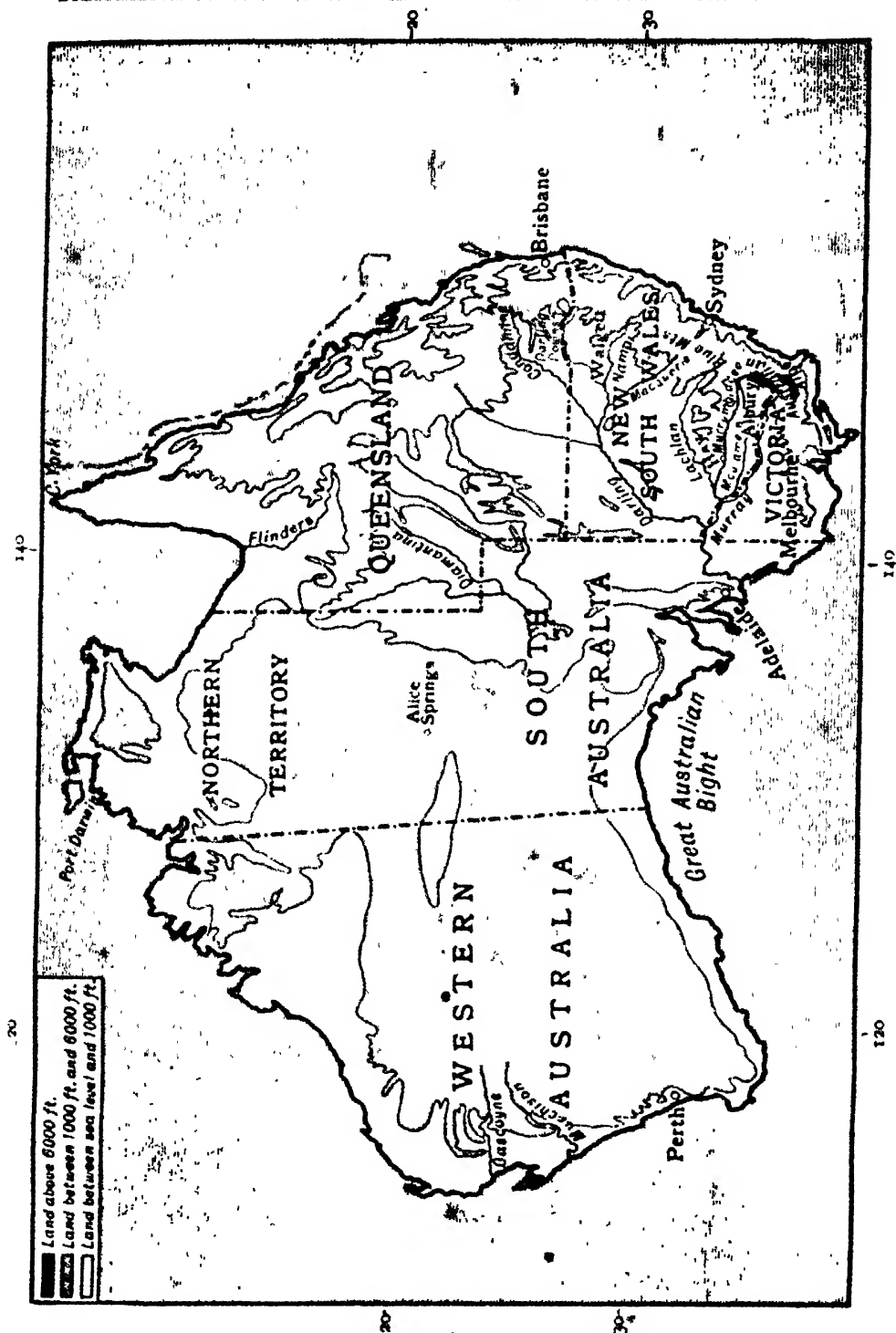
States.	Area in 1000 sq. miles.	Per cent.	Population in 1000s.	Per cent	Density per sq. mile.
New South Wales -	310	10.4	1,605	37.2	5.2
Victoria -	88	3.0	1,273	29.5	14.4
Queensland -	671	22.5	558	13.0	0.8
South Australia -	904	30.0	407	9.5	0.5
West Australia -	976	33.2	271	6.3	0.3
Tasmania -	26	0.9	186	4.5	7.1
Commonwealth -	2,975	100.0	4,300	100	1.4

Fig. 33 shows that on the coast lands the population is on the average denser than 1 person in 16 square miles and that the interior is not populated at all.

Boundaries. - The six States which make up the Commonwealth of Australia are separated by the natural boundaries of Bass Strait between Victoria and Tasmania, the river Murray between Victoria and New South Wales, and in part the river Darling between New South Wales and Queensland. The other boundaries are artificial and are parallels and meridians.

Relief. - There is little mountain in the country; the whole area is upland surrounded by a comparatively narrow coastal sill of lowland, and has in the interior a lowland basin of internal drainage into Lake Eyre. The majority of the rivers are therefore short and flow quickly to the sea; the exceptions are the Lake Eyre system and the system of the Murray. The gradients of the country are also slight, with the exception of the sea slopes in the south-east corner (Fig. 28).

Murray rivers.	Length in miles	Other rivers.	Length in miles
Murray -	1600	Diamantina -	468
Murrumbidgee -	1050	Flinders -	520
Lachlan -	850	Gascoyne -	475
Darling -	1760	Murchison -	440
Murray-Darling-Condamine	3800		
Macquarie -	590		
Namoi -	430		
Moulamein -	400		



Rivers. The lengths of those Australian rivers which exceed 400 miles in length are given in the above table. An examination of the rivers on the map shows that the average fall of all these rivers is less than 1 foot per mile; the Murray falls less than 9 inches per mile; in consequence, whenever the rainfall is very heavy large portions of the river valleys are flooded. At the same time the rivers are building up their beds and flow usually between banks elevated above the surrounding land.

Much of the neighbouring land is swampy, but can be cultivated after the river banks have been improved and the land drained.

The Murray rivers receive their water supply from the Eastern Highlands, the main stream being fed by the melting snows of the **Australian Alps**. The water flows through a region of high evaporation and frequently there is little or no surplus of fresh water. Paddle boats reach **Echuca** on the Murray, and, in flood time, **Hay** on the Murrumbidgee, and **Walgett** on the Darling. The water of the river is used partly for irrigation; the most notable examples of the fruitfulness of arid soil when irrigated are the crops of **Mildura** and **Renmark**.

Other similar areas.—Elsewhere on the earth there are two areas which present certain similarities to Australia.

The first is the region of North Africa. If we imagine North Africa an island with an ocean round it by way of the **Red Sea** and the Congo Basin, and that this island were placed north of the equator opposite to Australia south of the equator, the western sides of these islands would be very similar.

The islands would both have rolling upland plateaus in the interior, both an internal drainage system, both an arid west coast, and the largest river towards the east.

The second similar region is the eastern part of the United States, which is similar to the land east of the Murray river region. In both cases there is the narrow coastal sill, and the upland ridge with an extensive river valley beyond.

The Great Australian Divide presents even greater difficulties to those who would reach the interior than are offered by the **Appalachians**.

On the other hand, the Murray and its tributaries are not to be compared in size with the Mississippi rivers. In this case the similarity is mainly in surface relief in relation to access from the ocean.

SUMMARY.

1. Australia is smaller than Europe, and about as large as Africa north of the equator.
2. There is comparatively little mountain, or lowland.
3. The basin of internal drainage is into Lake Eyre.
4. Australia west of longitude 140° E. presents some likeness in relief to Africa west of 30° E.
5. The region east of the Murray rivers presents somewhat similar relief to the United States east of the Mississippi.

20. The Climate of Australia.

1. Enter average temperatures and variations in temperature from the table (pp. 81-2) in the record book.
2. Enter pressures similarly from the table (pp. 81-2).
3. Enter the rainfall records from the table (pp. 81-2).
4. Record the parts of Australia with a rainfall of less than 5 inches per annum and of more than 20 inches.
5. What parts of Australia have winter and what parts have summer rains?

THE CLIMATE OF THE AUSTRALIAN CAPITALS.

	MONTHS.												YEAR.
	1	2	3	4	5	6	7	8	9	10	11	12	
SYDNEY.													
T.	52	55	59	64	67	70	72	71	69	65	59	54	63
P.	+12	+10	+5	—	-2	-8	-7	-3	+5	+10	+9	+9	+3
R.	4.7	3.2	3.0	3.0	3.1	2.5	3.6	4.9	5.1	5.6	5.2	5.5	49.4
MELBOURNE.													
T.	49	51	54	58	61	65	67	67	65	60	54	50	58
P.	+13	+8	+2	-1	—	-8	-7	-2	+7	+12	+13	+10	+4
R.	1.9	1.8	2.3	2.7	2.3	2.3	1.9	1.7	2.1	2.4	2.1	2.1	25.6
BRISBANE.													
T.	58	61	65	70	73	76	77	77	75	70	64	60	69
P.	+12	+14	+8	+4	+1	-5	-9	-6	+1	+10	+15	+11	+5
R.	2.2	2.4	2.2	2.7	3.7	5.0	7.6	7.0	6.7	3.3	3.0	2.1	47.9

THE CLIMATE OF THE AUSTRALIAN CAPITALS *Continued.*

	MONTHS.												YEAR.
	1	2	3	4	5	6	7	8	9	10	11	12	
ADELAIDE.													
T.	52	54	57	62	67	71	74	74	70	64	58	54	63
P.	+10	+12	+7	+2		5	6	2	-7	+14	+15	+12	+6
R.	2.6	2.3	1.7	1.8	1.0	0.8	0.8	0.6	1.1	1.9	2.7	3.0	20.3
PERTH.													
T.	55	50	58	61	66	71	74	74	71	66	61	57	64
P.	+13	+13	+9	+5	+4	3	5	4	+2	+10	+12	+8	+5
R.	6.2	5.0	3.3	2.1	0.8	0.6	0.3	0.3	0.8	1.7	4.9	6.6	33.2
HOBART.													
T.	46	48	51	54	57	60	62	62	59	56	51	47	54
P.	-4	-5	-14	-18	-16	-18	16	-9	-2	+1	+4		8
R.	2.2	1.8	2.1	2.1	2.6	1.9	1.8	1.5	1.6	1.8	1.9	2.2	23.5

T=average temperature in ° F.

P=variations in pressure from 30.00 inches, + indicating above 30.00 inches and - below; the numbers given are in hundredths of an inch.

R=total rainfall in inches.

Temperatures.—The Australian capital cities are on the coast and typify the coast climates. Towards the south, Melbourne and Hobart experience the lowest temperatures, the temperature in Hobart being on the average 3° F. below that of Melbourne. Sydney, Adelaide, and Perth are all usually about 5° F. warmer than Melbourne, and Brisbane is about 6° F. warmer than Sydney.

The monthly changes of temperature are regular over the whole sea-board. Inland, the difference between winter and summer temperatures is greater; e.g. at Alice Springs, the winter temperature falls to 53° F. in July and rises to 84° F. in January. At the same time, the average daily movement of the thermometer on the coast is from 10 to 20 degrees Fahrenheit, while inland this diurnal variation reaches 30° F. Port Darwin has tropical temperatures averaging 83° F. for the year, with a difference from winter to summer of only 7° F. and a daily change of about 20° F. These facts are further shown on the map (p. 24).

Pressures and winds. The table of pressures for the capital cities shows a uniform fall of pressure during the summer and a uniform rise during the winter; and shows the presence of low pressures south of Australia by the low pressures of Hobart. As a rule, the changes in pressure from day to day depend upon a succession of high-pressure systems which pass across the continent from west to east. Between these high-pressure systems complete low-pressure systems sometimes occur, with an accompaniment of atmospheric disturbance and storms, but more frequently the depression is only V-shaped, as shown in Fig. 29.

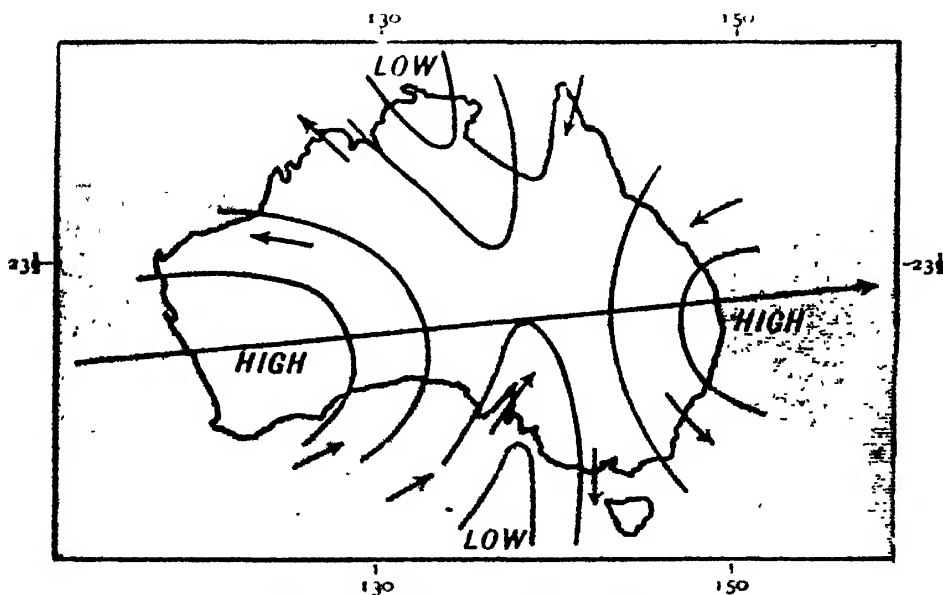


FIG. 29.—A V-SHAPED DEPRESSION.

These V-depressions occur about thirty times a year, and usually are accompanied by cold winds after hot weather: these winds blowing from the south are called **southerly bursters**. On the south-east shore land a wind sometimes blows from the highlands with a föhn effect (p. 30). On the north-west coast during the summer monsoon season a cyclonic storm (called locally a *willy willy*) sometimes blows in from the sea. Occasionally, the monsoon winds blow across the continent, and make a hot, dry wind from the interior over the south-eastern states (*brickfielder*).

Rainfall. The most important climatic feature of Australia is the rainfall: in the north this is heaviest on the coast, mostly falls in summer, and is of the monsoon type (p. 53). In the south the rain is heaviest on the coast, and falls largely in the winter.

Inland, the fall is small in quantity, and at Alice Springs rain falls mainly in the spring and summer. The table below shows the percentages for the various seasons.

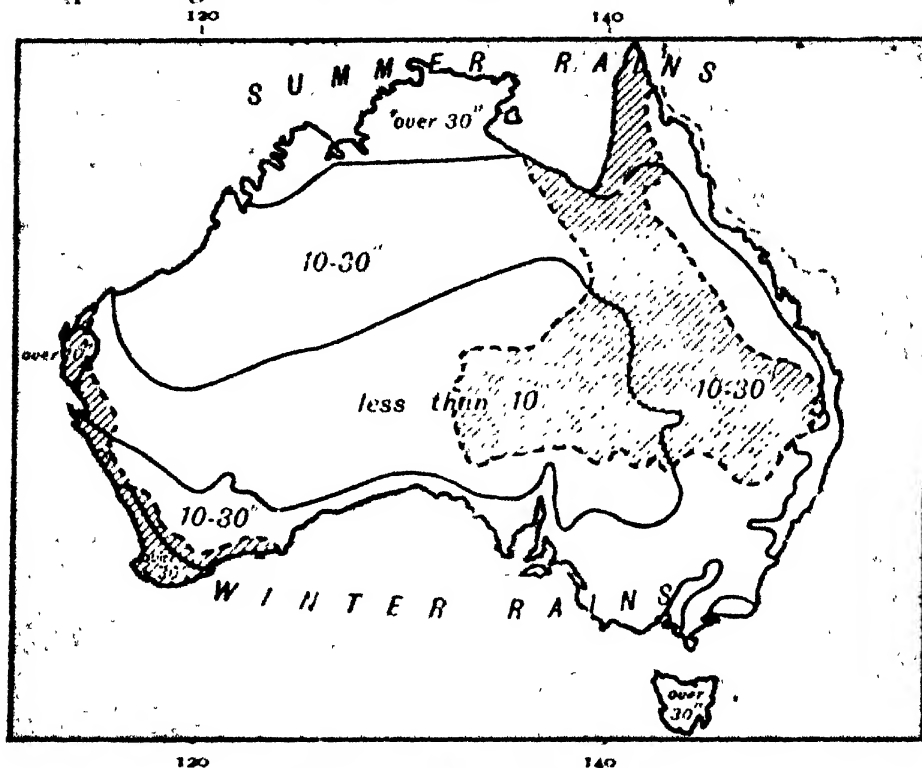


FIG. 30.—RAINFALL IN AUSTRALIA.

The shaded areas show the regions of underground water supply.

PERCENTAGES OF RAINFALL DURING THE SEASONS.

	Winter (12-2).	Spring (3-5).	Summer (6-8).	Autumn (9-11) *
Sydney - -	27	18	22	33
Melbourne - -	23	28	23	26
Brisbane - -	14	18	41	27
Adelaide - -	39	22	11	28
Perth - -	55	18	4	23
Hobart - -	26	29	22	23
Port Darwin - -	0	11	65	24
Alice Springs - -	10	20	46	24

* The numbers in parenthesis (12-2) refer to the months.

In Fig. 31, the divisions of South East Australia into four areas of different climate is shown to be largely dependent on rainfall. The rainfall decreases with distance from the coast. Connected

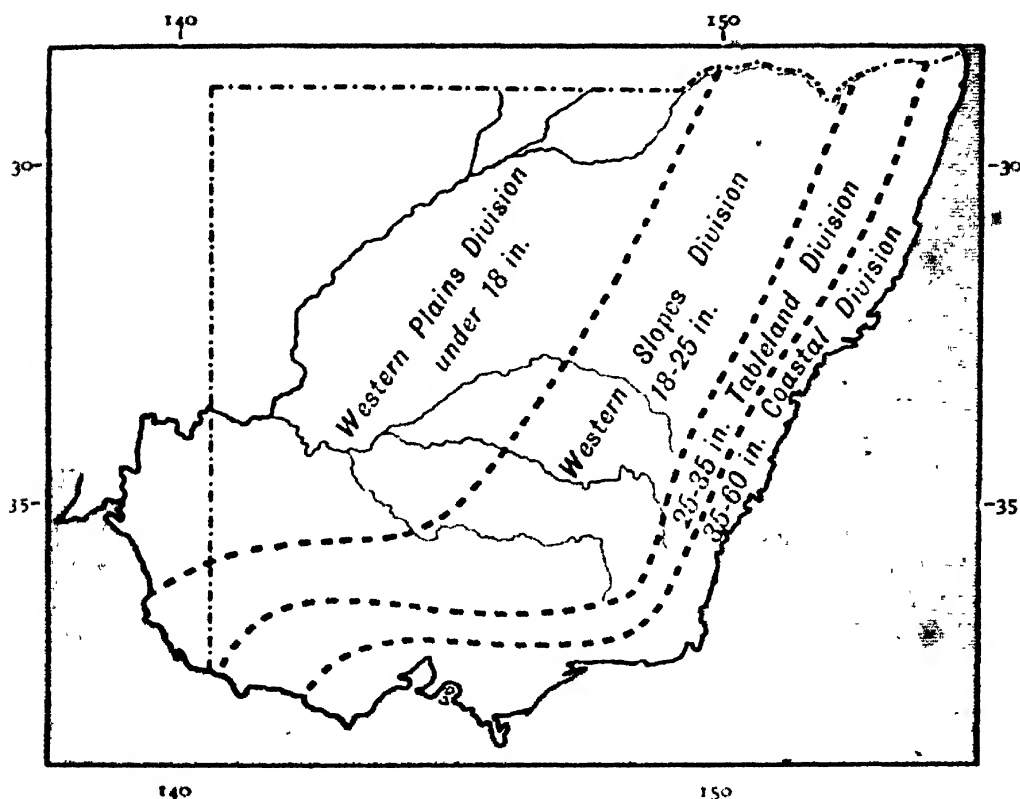


FIG. 31.—CLIMATE DIVISIONS OF SOUTH EAST AUSTRALIA.

with the water supplies from rain is the underground water supply, and in Fig. 30 the shaded area denotes those parts of the continent from which underground water can be obtained by boring. The supply from these artesian bores supplements the rainfall and river supplies, and renders this region more populous. The usefulness of these bores for supplying water is shown in the picture (Fig. 32). In the dry seasons many Australian rivers become a series of disconnected pools lying along a river bed.

Cloudiness and sunshine.—The continent has, on the whole, clear skies, and only in the neighbourhood of the low-pressure belt, that is, in Victoria and Tasmania, is the sky more than half cloud-covered on the average for the year. The hours of sunshine are consequently continuous and proportionately numerous.

SUMMARY.

1. Australia consists of four climatic regions : (a) the interior ; hot and dry. (b) the northern coast lands ; tropical and wet in summer. (c) the southern coast lands ; temperate and wet in winter. (d) the eastern coast lands ; wet on the coast, drier inland.



FIG. 32 — AN ARTESIAN BORE IN AUSTRALIA.

2. In Australia the farmer can always work out of doors, he rarely finds the ground frozen.

3. Lack of water supply through deficient rainfall is most apparent on the western plains in the Eastern States, and has forced attention to underground water supplies.

4. Local storms are - "willy willies," "brickfielders," and "southerly bursters."

21. Vegetation and Production.

1. Record the vegetation regions of Australia on an outline map.
2. Mark on this outline map the cereal growing areas and the sheep rearing areas from the table (pp. 87, 89).

CEREAL PRODUCTION IN 1000 QUARTERS.

	Wheat.	Oats.	Barley.	Maize.
New South Wales	2,155	131	14	660
Victoria	2,422	887	141	77
Queensland	122	2	12	370
South Australia	2,351	110	65	1
West Australia	333	61	7	—
Tasmania	86	196	17	—
Commonwealth	7,469	1,387	256	1,108

INTERSTATE TRADE IN CEREALS.

NET IMPORTS OR EXPORTS IN 1000 QUARTERS FROM OR TO OTHER AUSTRALIAN STATES.

	WHEAT AND FLOUR.		BARLEY.		OATS.		MAIZE.	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
New South Wales	—	41	6	—	102	—	110	—
Victoria	14	—	18	—	—	57	—	11
Queensland	182	—	—	2	12	—	—	103
South Australia	—	233	—	25	—	26	3	—
West Australia	—	2	3	—	77	—	1	—
Tasmania	80	—	—	—	—	108	—	—
Total	276	276	27	27	191	191	114	114

Farming. Australia is a farmers' country. Cereals are grown on the settled lands; the quantities produced in comparison with other countries are not large, although in the case of wheat there is more than twice as much grown as is needed for the home population. The States of New South Wales and South Australia grow the wheat necessary to make up the supplies required by the other States while, in most years, Victoria grows enough

wheat for her own use, but in special circumstances has to import wheat (Table p. 87). As shown in the tables, Victoria and Tasmania grow oats and supply the other States. New South Wales and Queensland grow maize; and Victoria is the main grower of barley. Tasmania has surplus stocks of oats, Queensland of maize, and South Australia of barley.

COMMONWEALTH EXPORTS OF WHEAT, ETC.

		Wheat 1000 qrs.	Flour in Equivalent Quarters of Wheat.	Total : Wheat and Flour.
British Empire.	To			
	United Kingdom -	2439	184	2623
	Cape of Good Hope -	481	81	562
	Ceylon - - - -	7	14	21
	Fiji - - - - -	—	8	8
	Hong Kong - - -	4	117	121
	India - - - - -	20	—	20
	Mauritius - - -	—	20	20
	Natal - - - - -	34	143	177
	New Zealand - -	2	16	18
	Straits Settlements -	—	91	91
Total - - - -		2987	674	3661
Belgium - - - -		5	—	5
Canary Isles - -		27	—	27
Chile - - - - -		132	4	136
China - - - - -		25	15	40
Egypt - - - - -		14	—	14
France - - - - -		6	—	6
Germany - - - -		4	—	4
Italy - - - - -		10	—	10
Japan - - - - -		38	14	52
Java - - - - -		—	92	92
New Caledonia -		8	23	31
Peru - - - - -		153	—	153
Philippines - -		—	74	74
Portuguese E. Africa		2	79	81
Spain - - - - -		70	—	70
Sweden - - - - -		3	—	3
Other Countries -		13	25	38
Total - - - -		3497	1000	4497

Trade in cereals.—In addition to growing wheat to supply neighbouring lands and the United Kingdom, Australia grinds wheat to flour for the neighbouring lands which are deficient in flour mills. The table below shows that Australia supplies about 80 per cent. of her surplus wheat to other countries in the British Empire, and of this amount $\frac{7}{10}$ ths goes to the United Kingdom. Cape of Good Hope, Chile and Peru are big importers of Australian wheat, and Cape of Good Hope, Natal, Hong Kong, Java, the Philippines and the Straits Settlements, and Portuguese East Africa, import comparatively large quantities of Australian flour.

Ranching or Stock-raising.—Being a grass-land country, Australia has many animals. **Horses** are reared and exported to India; **cattle** supply dairy produce and meat for home and export; **pigs** similarly provide food stuffs; but the animal of importance is the **sheep**, of which Australia holds $\frac{1}{4}$ th of the world's flocks and produces about half the world's wool supply.

DOMESTIC ANIMALS IN AUSTRALIA IN THOUSANDS.

	Horses.	Sheep.	Pigs.	Cattle.
New South Wales	541	42,700	256	2,546
Victoria	406	12,846	235	1,795
Queensland	457	14,720	145	3,423
South Australia	222	6,579	108	679
West Australia	105	3,382	61	698
Tasmania	39	1,686	54	211
Commonwealth	1770	81,913	859	9,352

ANIMAL PRODUCTS.

	Wool. Million lbs.	Butter. Million lbs.	Cheese. Million lbs.	Bacon and Ham. Million lbs.
New South Wales	332	54	5	11
Victoria	81	63	5	17
Queensland	86	22	3	10
South Australia	45	9	1	2
West Australia	18	4	—	—
Tasmania	11	1	—	—
Commonwealth	573	153	14	40

Horses and pigs are evenly distributed ; there is an excess of cattle in Queensland ; but the sheep are mainly towards the east. Animal products are mainly obtained in the eastern States.

Trade in animal products.—As shown by the following table and that on p. 44, Australia sends about 40 per cent. of the wool received by the United Kingdom, and an almost equal quantity is distributed among the other countries of the North Atlantic Ocean ; and of the 264 million lbs. imported by Britain a large portion is re-distributed later to these same countries.

Australia feeds the neighbouring peoples with meat as with wheat, and the supplies of meat to Egypt and Malta form an interesting commentary upon the route followed by steamers to Britain from Australia.

To	Wool Million lbs.	Frozen Beef Million lbs.	Frozen Mutton Million lbs.
United Kingdom	207	4	73
British South Africa		19	21
Egypt - - -		2	1
Malta - - -		1	1
Straits Settlements		1	
Gibraltar - - -		1	
Canada - - -			1
Russia - - -		10	
Philippines - -		11	1
France - - -	130		
Germany - - -	79		
Belgium - - -	64		
U.S.A. - - -	18		
Other Countries	9		
	597	49	98

Other products.—In addition to cereals—wheat, oats, etc.—Australia produces **cane sugar** in Queensland and New South Wales, and **wines** in the south-eastern States. The produce of cane sugar is 36 million cwts., of which Queensland produces 32 million cwts. In addition to this quantity a small amount is imported, and the total amount is distributed among the six States

of the Commonwealth. The wine produced amounts to five million gallons, South Australia producing about half and Victoria about one-third. About one-fifth of the production is exported. The vines provide table grapes, raisins and currants for consumption at home. The animal produce includes hides and skins, tallow, hoofs and horns. There are also small ostrich farms; and in the dry interior camels and mules are used as beasts of burden.

Forests.—In the Riverina district of the Murray basin, the land is covered with grasses, and here and there belts of gum trees are found along the water courses, and groves of murray pine at intervals. On the tableland there are forests of gum trees, and on the eastern coast lands the forests include valuable cabinet-wood trees, such as cedar and rosewood.

In Western Australia there is the coastal timber belt near the Murchison River, and east of the Darling Range a forest of Jarrah wood, 350 miles long and 100 miles wide. The main exports of timber are to the neighbouring lands of Asia and Africa.

SUMMARY.

1. Australia contains hot deserts, tropical forests, grass lands and temperate forests.
2. The grass-land belt provides food stuffs, wheat, meat, etc., and raw materials, wool, etc., for the neighbouring lands and for the shore lands of the North Atlantic Ocean.
3. Australians are therefore farmers and ranchers (pastoralists), and some of the town industries deal with the preparation of food stuffs, etc., for their markets: e.g. flour milling, meat freezing.
4. Grass-land products are mainly produced on the belt of grass land between the desert and the eastern highlands.
5. As the rivers are dammed and as artesian wells are bored, the farming and stock-raising operations can be extended further from the coast.
6. Except in the wool trade, Australia is at present of no great importance to the world as a producer.

QUESTIONS.

1. Draw a full-page map of Australia, showing State boundaries, mountain systems, and main drainage basins. (U.S.)
2. Draw an outline map of West Australia, and on it name and mark the positions of the following: Four towns, three rivers, three harbours, and three mountain ranges. (U.M.)

3. Draw a map of Queensland. Mark on it Great Barrier Reef, Moreton Bay, Thursday Island, Darling Downs, Brisbane River, Fitzroy River, Endeavour River, Flinders River, Mackay, Rockhampton, Charters Towers, and Townsville. (U.M.)

4. Write a brief description of the Commonwealth of Australia, describing its position, climate and surface, and naming its rivers, chief cities and principal products. (Mun.)

5. Name the six principal cities of the Commonwealth of Australia, the provinces in which they are situated, and the products which are exported. (P.F.I.)

6. Draw a sketch-map of Australia, mark (without boundaries) the political divisions and the capital of each. Shade in black the part that is within the tropics, and in red the districts where gold is found. Mark the Australian Alps and the Darling Murray. (U.S.C.)

7. With the aid of a sketch map or maps, give a careful account of the Continent of Australia, having special regard to the configuration of the land, the prevalent winds, the distribution of rainfall, and the character of the products of the several parts. (I.C. Com.)

8. Describe the peculiarities of the physical features of Australia. Show how these peculiarities affect its climate and commercial development. (I. C. Com.)

9. Draw an outline map of Australia, inserting the boundaries of the different States of the Confederation. Describe the climate and the vegetable productions of any one State. (Newf.)

10. State and explain the extent to which the distribution of the population of Australia is dependent upon the industries of the people. (N.S.W.)

11. Draw a map of the coast of Australia from Cairns to Fremantle (via Sydney), showing the position of (i) the principal ports, (ii) the coastal and inland railway termini. (N.S.W.)

12. What are the usual meteorological conditions that give rise to storms of wind and rain? Illustrate the subject by describing the course of an atmospheric disturbance passing along the southern parts of Australia. (U.A.)

13. State briefly the nature of the chief weather-governing disturbances affecting Southern Australia. (U.A.)

14. Illustrate, by a rough sketch-map, the directions of the prevalent air currents which affect Australia, and explain their relation to the general terrestrial circulation of the atmosphere. (U.M.)

15. State, apart from the question of latitude, the main causes of the climatic differences between eastern, central, and south-western Australia. Deduce from the differences observable some broad distinctions of industrial occupation in these divisions. (N.Z. Ed.D.)

16. Compare and contrast the climate of Hobart, Port Darwin, Mount Kosciuszko, and Lake Eyre. What are the main conditions governing the climate of these four places? (U.M.)

17. How would the climate of Eastern Australia be affected if the State of South Australia were (a) raised into a plateau with an altitude of 7000 feet, (b) replaced by a belt of deep water connecting the Timor Sea with the Southern Ocean? (U.S.)

18. Give a general account of the rainfall of Australia, especially noting its relation to surface relief. From your deductions draw a sketch-map of Australia, showing approximately the lines of equal rainfall. (U.S.)

19. Compare and contrast Queensland and Victoria as to position, climate and productions. (N.Z. Ed.D.)

22. Mineral and other Products.

1. Mark on an outline map of Australia the positions of the mining towns and districts named in the lists below :

Coal. (N.S.W.) Newcastle, Illawarra, Lithgow ; (V.) Jumbunna ; (Tas.) Fingal.

Gold. (N.S.W.) Cobar, Lachlan ; (V.) Ballarat, Beechworth, Bendigo, Castlemaine, Maryborough, Gippsland ; (Q.) Charters Towers, Mt. Morgan, Gympie ; (W.A.) Murchison, Kalgoorlie ; (Tas.) Northern and Southern (Beaconsfield).

Silver and Lead. (N.S.W.) Broken Hill ; (Tas.) Zeehan.

Zin. (Tas.) Mt. Bischoff ; (Q.) Herberton.

2. Compare the gold production of Australia with that of other countries.

GOLD PRODUCTION IN MILLION £.

U.S.A.	-	18	Australia	-	15	Transvaal	-	24
Canada	-	3	New Zealand	-	2	Rhodesia	-	2
Mexico	-	3	India	-	2	Rest of Africa	-	1
Rest of America	-	2	China	-	1	Russia	-	5
Other countries	-	1	Rest of Asia	-	2	World total	-	81

AUSTRALIAN MINERALS.

	Coal in million tons.	Gold in million £.	Silver and Lead in million £.	Copper in million £.	Tin in million £.
New South Wales	8	1	3.2	0.7	0.3
Victoria	—	3	—	—	—
Queensland	1	3	0.1	0.8	0.4
South Australia	—	—	—	0.7	—
West Australia	—	8	—	—	0.1
Tasmania	—	—	0.5	0.8	0.5
Commonwealth	9	15	3.8	3.0	1.3

Mining—Australia is also a miners' country. The above table shows that New South Wales has productive coal mines. Newcastle

mines gas and house coal, and Illawarra and Lathgow steam coal. **Gold** occurs extensively at Kalgoorlie in Western Australia, while the production exceeds £1,000,000 in value per annum. Other important mines are named in the list on p. 93, all of which produce over £100,000 worth of ore in a year, except those italicised. The great silver and silver lead mines are at Broken Hill (N.S.W.), which accounts for over three-quarters of the total amount produced in Australia.

The value of the coal mined amounts to about £3,000,000 per annum, and the total value of all minerals exceeds £26,000,000 each year.

Iron ore is not mined extensively in Australia.

Mineral exports.—Most of the exports of the minerals other than coal go to the United Kingdom, as shown in the table below; Belgium takes the next share and other countries of the North Atlantic basin receive smaller quantities.

AUSTRALIAN MINERAL EXPORTS.

Article.	Value in million £	Countries.*
Gold -	11	United Kingdom, Ceylon, India.
Silver -	1	United Kingdom, Belgium.
Lead -	1½	United Kingdom, Belgium.
Copper	3	United Kingdom, U.S.A., Belgium.
Tin	1	United Kingdom.

* Main country in **black type**.

Coal is exported to countries on the opposite shores of the neighbouring oceans, and thus the coal supply of New South Wales supplements the British coal supply which is distributed to lands on the shores of the Atlantic Ocean (p. 63). Australian exports of coal are about $\frac{1}{12}$ th those of Britain.

NEW SOUTH WALES COAL EXPORTS.

To:	In million tons	To:	In million tons
Victoria -	0.9	Straits Settlements -	0.1
South Australia -	0.6	Peru -	0.1
Chile -	0.9	Hawaii -	0.1
United States	0.5	In ships (bunker coal) -	1.1
New Zealand -	0.2	Total -	4.8
Philippines -	0.3		

Effects of the mining industry. The development of Australia has been quickened by the discovery there of deposits of the precious metals. The growth in population during the last half century has been hastened by immigrant gold seekers. The discovery and settlement of the interior lands and of Western Australia has been largely due to the mineral deposits. The settlements at **Broken Hill** (N.S.W.) have made that town tenth in population in the Commonwealth. The mines at **Kalgoorlie**, **Coolgardie**, and **Menzies** have caused extensive waterworks to be carried out across the semi-desert interior of Western Australia (Fig. 31).

The railway system of the Commonwealth shows the effect of the mines in the number of lines which run from the coast inland, without connection, at present, with other railway lines (Fig. 34).

Other lines, however, such as that to Oodnadatta and Mildura run inland without terminating at mining towns.

Manufactures.—Australia, at present, is concerned mainly with the production of food-stuffs and raw materials, but with an increasing population she is beginning to manufacture for her own needs. One Australian in 18 is at work in some sort of factory, and one in 4 is engaged in producing some form of clothing.

Other manufactures are those in connection with the export trades in wool, meat, etc.

Commerce. The number of Australians employed in commerce is necessarily small and they supervise the imports and exports mentioned in the following tables, which supplement those already given.

Imports and exports. Half the imports of Australia have their origin in Britain; but ships bring from British ports over 60 per cent. of the total imports.

The principal classes of goods are apparel and textiles, machinery and metal goods. Most of these come from the British Isles but about one-third of the machinery is sent by Germany.

Imports from lands across the neighbouring ocean are oils, bags and sacks, tobacco, timber and tea. These imports from India, Ceylon, etc., and the exports to neighbouring lands—trade over the neighbouring sea—show an important feature of Australian trade which is sure to develop.

Food stuffs, especially flour, are sent to Singapore, Hong Kong, Java, and the Philippines.

PRINCIPAL AUSTRALIAN IMPORTS.

Articles.	Value in million £	Countries of Shipment.*
Apparel and textiles	13	United Kingdom (90 %), Germany, Japan, U.S.A.
Machinery - -	3	United Kingdom (50 %), U.S.A. (30 %), Germany.
Metal goods - -	2	United Kingdom (75 %), U.S.A., Germany.
Iron and steel goods	5	United Kingdom (75 %), Germany, U.S.A., Belgium.
Bags and sacks (jute)	1	India.
Oils - - - -	1	U.S.A. (75 %), United Kingdom.
Drugs and fertilisers	1	United Kingdom (75 %), Germany, U.S.A., Belgium.
Paper - - - -	1	United Kingdom (50 %), Germany, U.S.A.
Spirits - - - -	1	United Kingdom (80 %), France, Germany, Holland.
Tobacco - - - -	1	U.S.A. (70 %).
Timber - - - -	1	U.S.A. (60 %), Norway, New Zealand.
Tea - - - -	1	Ceylon (60 %), India (30 %).

* Main country in **black type**.

AUSTRALIAN EXPORTS (£1000) TO NEIGHBOURING LANDS.

	Wheat.	Flour.	Other Grains.	Fodder.	Horses.	Frozen Meat, etc.	Butter.	Tallow, etc.	Timber.	Sandal-wood.	Coal.	Copper.	Wool.
India, Ceylon,) Burma	36	18	4	9	190	16	7	9	320	—	27	112	13
Sts. Settlements	—	108	1	2	20	18	16	—	3	4	66	—	—
China - - -	35	18	2	—	4	3	13	—	52	9	22	147	—
Hong Kong -	6	139	7	7	40	8	17	1	1	45	30	18	3
Philippines -	—	95	3	14	6	141	23	1	37	—	133	—	—
Japan - - -	51	17	11	—	15	4	4	55	3	—	3	7	301
Java - - -	—	115	1	1	14	4	34	1	—	—	23	1	—

SUMMARY.

1. Australia mines most of the valuable minerals except iron: her gold supply is almost one-fifth of that of the world.
2. Australia supplies coal to her neighbours.
3. Australia supplies food-stuffs to her neighbours.
4. Australia imports large quantities of apparel, etc., but is beginning to manufacture for her own people.
5. The mining of the mineral deposits of Australia has quickened the development of the interior.

23. Towns, Communications, etc.

1. Mark on an outline map of Australia the following towns, distinguishing the sizes by different shaped dots.

Towns and population.

(i) Sydney (577,000), Melbourne (538,000), Adelaide (178,000), Brisbane (136,000).

(ii) Newcastle (63,000), Perth (50,000), Ballarat (49,000), Bendigo (40,000), Hobart (40,000), Broken Hill (31,000), Kalgoorlie (29,000), Geelong (28,000), Launceston (25,000), Fremantle (21,000), Charters Towers (21,000).

(iii) Rockhampton (20,000), Kadina (16,000), Townsville (16,000), Ipswich (15,000), Gympie (14,000), Toowoomba (14,000), Parramatta (13,000), Maryborough (13,000), Port Pirie (12,000), Maitland (11,000), Goulburn (11,000).

2. Underline with different coloured lines the names of the mining towns on the map made in the previous exercise.

3. Enter from the map on p. 99 the main railway lines connecting towns named in the above lists on the outline map of Australia.

4. Show on the outline map the ports named in the table on p. 100; numbering them in order of merit of total tonnage.

Distribution of people.—The majority of the people of Australia live within the shaded area shown on the map, Fig. 33. One-fifth of the people at least, live in the two cities of Sydney and Melbourne; and one-third of the population live in the fifteen towns which have a population each of over 20,000. The majority of the townships have become towns either because they are mining centres, such as **Broken Hill**, **Maitland**; or because they

are ports, **Fremantle** and **Port Pirie**. There is thus a tendency for mining and commerce to force the people into towns, and for agriculture and stock-raising to keep the people in the rural districts.

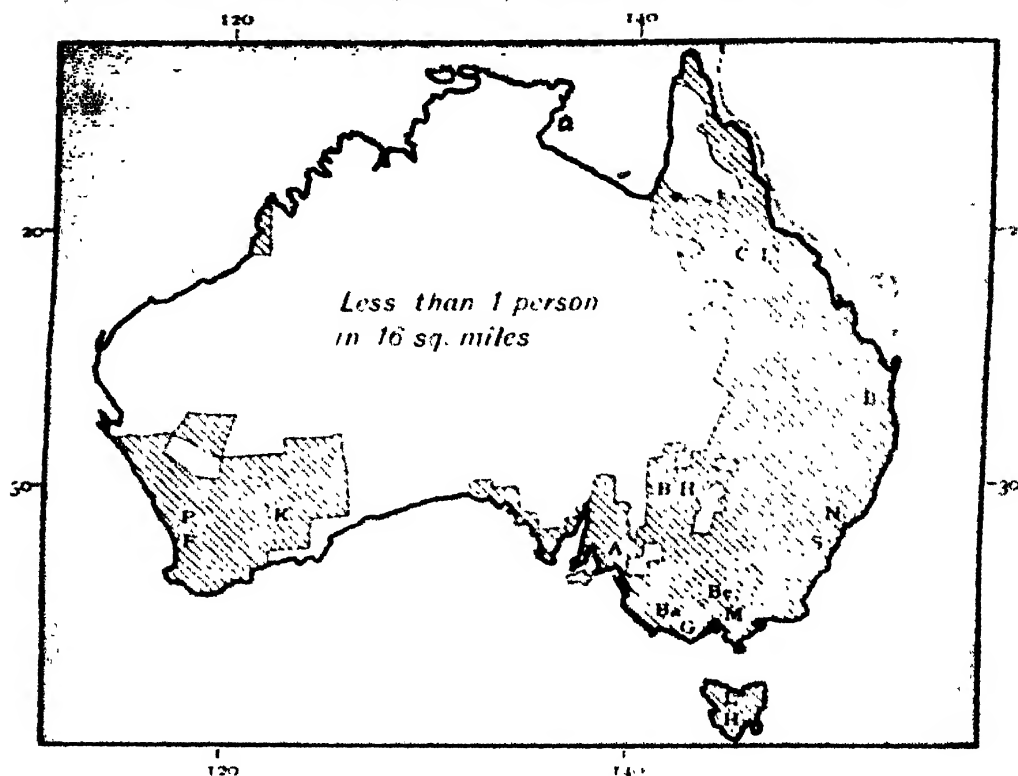


FIG. 33 - POPULATION IN AUSTRALIA.

S - Sydney	P - Perth	K - Kalgoorlie
M - Melbourne	Ba. - Ballarat	G - Geelong
A - Adelaide	Be. - Bendigo	L - Launceston
B - Brisbane	H. - Hobart	F - Fremantle
N - Newcastle	B.H. - Broken Hill	C.T. - Charters Towers

The inland communications. The map in Fig. 34 shows that the railway lines of Australia serve the area of denser population. The main line of connection runs from Oodnadatta, through Adelaide, Melbourne, Sydney, Brisbane, Rockhampton to Longreach; this line has branches to the mining centres such as Broken Hill.

Other lines merely connect a mining district with its port, e.g. the Goldfields district to Fremantle and Albany.

The proposed transcontinental lines from Adelaide northwards and westwards are important for the future development of the interior.

COMMUNICATIONS

River communications are not of great importance, although there is some traffic on the Murray-Darling (p. 80).

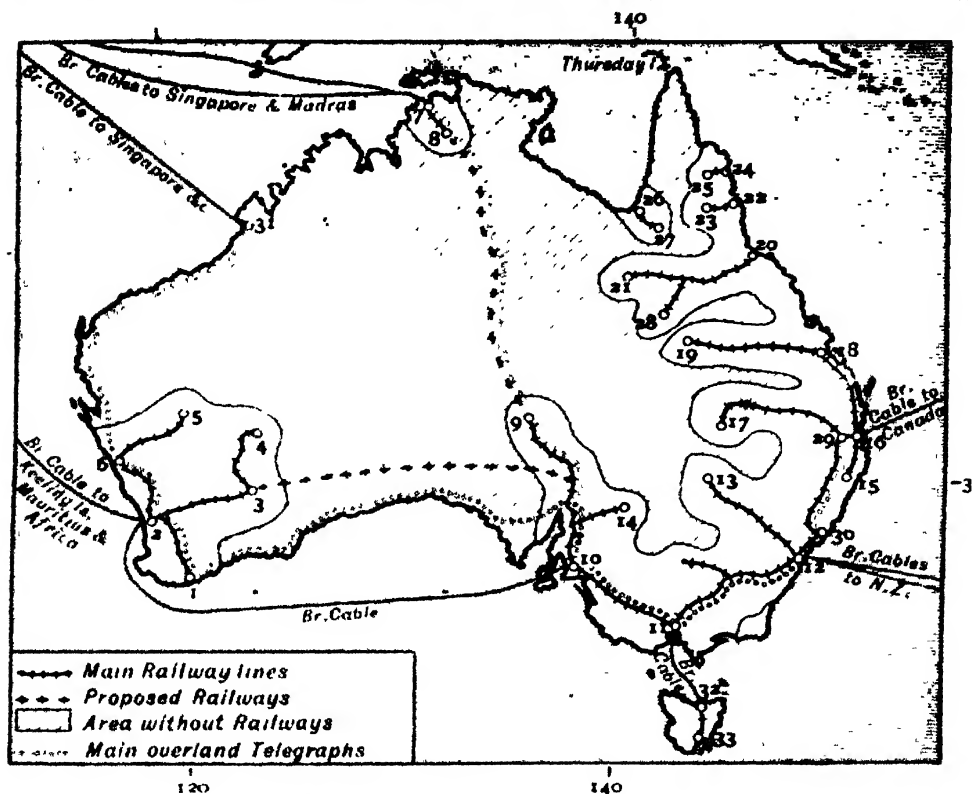


FIG. 34.—AUSTRALIAN RAILWAYS AND TELEGRAPHS.

- | | | | |
|----------------|------------------|------------------|-----------------|
| 1. Albany. | 10. Adelaide. | 18. Rockhampton. | 26. Normanton. |
| 2. Perth. | 11. Melbourne. | 19. Longreach. | 27. Croydon. |
| 3. Kalgoorlie. | 12. Sydney. | 20. Townsville. | 28. Winton. |
| 4. Laverton. | 13. Bourke. | 21. Cloncurry. | 29. Toowoomba. |
| 5. Nannine. | 14. Broken Hill. | 22. Cairns. | 30. Newcastle. |
| 6. Geraldton. | 15. Grafton. | 23. Mungana. | 31. Broome. |
| 7. Palmerston. | 16. Brisbane. | 24. Cooktown. | 32. Launceston. |
| 8. Pine Creek. | 17. Cunnamulla. | 25. Laura. | 33. Hobart. |
| 9. Oodnadatta. | | | |

Sea communications.—The shipping of Australia is of three kinds :

- Oversea shipping to other lands,
- Interstate shipping, and
- Local shipping between ports in the same state.

The list of ports below gives the tonnage and exports of the chief ports. The volume of shipping for the interstate traffic is considerable, and the local shipping and oversea shipping are added to this to make the grand total.

The main routes for ocean transport are shown on the map on p. 64, and these are practically in two directions :

- (i) Through the Suez Canal both ways,
- (ii) or round the Cape of Good Hope on the journey to Australia and round South America on the return voyage.

In addition there is the route to San Francisco or Vancouver across the Pacific Ocean.

COMMONWEALTH PORTS.

Port.	Tonnage in 1000 tons.		Exports.
	Interstate.	Total	
Sydney	1493	3718	Wool, ores, wheat, meat
Newcastle	740	2045	Coal, wool, meat
Melbourne	2600	4509	Wool, gold, wheat, meat, butter, wine
Geelong	45	423	Wool, hides, potatoes
Brisbane	765	1839	Gold, wool, cotton, tallow
Bowen	239	348	Gold
Cairns	274	519	Gold, silver, tin
Mackay	274	632	Sugar
Rockhampton	465	580	Wool, ores
Thursday Island	1	235	Pearl shell
Townsville	510	943	Sugar, meat, wool, gold
Port Adelaide	1492	2313	Wool, copper, hides, gold
Port Pirie	210	433	Tin
Wallaroo	82	259	Copper
Albany	564	849	Wool, gold, pearl shell, timber
Fremantle	755	1599	Gold, sandalwood, ores, gum, wool
Hobart	241	760	Wool, grain, timber, hops, tin
Launceston	204	233	Wheat, oats, wool, timber, ores

Electric communications.— Australia is linked by cable to the rest of the world by the three cables :

- (i) From the North-west to Madras and thence to Europe ;
- (ii) By the single cable to Mauritius and thence to Africa and Europe ;
- (iii) By the Pacific Cable to Canada.

These cables are British and thus make a girdle of British cables round the world (the **all-red cable**). The important centres are

connected to these cables by land wires, the most important being the connecting lines from Brisbane through the state capitals to Broome and Port Darwin (Fig. 34).

QUESTIONS.

1. Describe briefly the main characteristics of the railway system of Australia, and point out how they have been controlled (*a*) by the position of the ports, (*b*) by the configuration, or climate, or products of the interior. (L. U.)

2. Compare the east and west coasts of Australia in respect to population and products, and give an explanation of the differences observed. (L. C. Com.)

3. Give an account of the way in which the resources of Victoria have been developed by means of railways, mines and irrigation schemes. (U.S.)

4. (*a*) What goods does Victoria export to Japan and China, and what do we get in return from those countries?

(*b*) The following goods are imported into Victoria: Tea, cotton goods, kauri pine, bananas, petrol for motors, coal, sulphur, fencing wire, guano, school slates. Name places from which the above would probably be obtained. (U.M.)

5. Describe under the heads of (*a*) production, (*b*) transport, (*c*) consumption, the live cattle industry of Australia, and compare the local conditions with those of (i) Argentina, (ii) Canada. (U.A.)

6. Name the chief markets for Australian flour, gold, hides and skins, horses, wattle bark, wool. (U.A.)

24. New Zealand.

1. Record details as to the area and dimensions of New Zealand from map measurements.

2. Find the distances from Auckland to Wellington, Dunedin and Christchurch.

3. Find the distance from New Zealand to Canada.

4. Record the percentages of lowland, upland, etc.

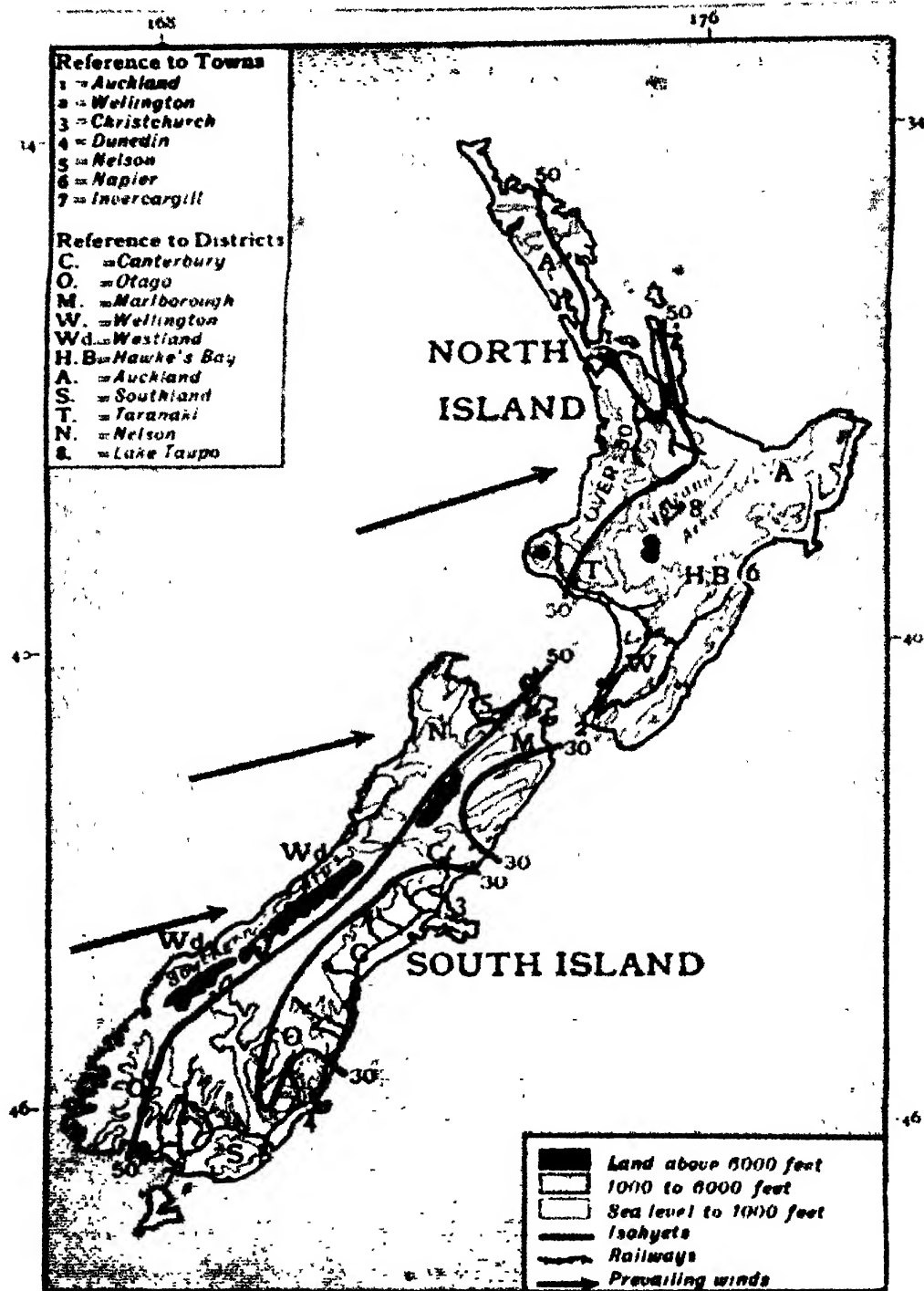
5. Record the temperature and pressure limits for New Zealand.

6. Record the vegetation regions of New Zealand.

7. Record the population of New Zealand.

8. Compare New Zealand and Australia as producers of (i) food-stuffs; (ii) raw materials.

Position.—New Zealand lies almost at the centre of the water hemisphere, almost at the antipodes of the United Kingdom. Antipodes Island is, however, further south.



Size.—The area of the islands making up New Zealand is roughly five-sixths of that of the British Isles. The population is just about a million, of whom about 5 per cent. are Maoris. Nearly a quarter of the people are congregated in the four urban districts of **Auckland, Wellington, Christchurch and Dunedin.**

Relief.—Much of New Zealand consists of upland, and rising from this the mountains which include the **Southern Alps** in South Island and the **Ruahine Range** in North Island (Fig. 35).

The Southern Alps have sharp peaks, deep valleys, and contain glaciers, the greatest of which is the **Tasman Glacier** 18 miles in length and about 1 mile in average width.

The lowland is confined largely to the Plains of **Canterbury** which are made of the alluvium deposited by the rivers from the Alps, and to the district of **Southland**; both are in South Island. In the north west of North Island are other lowlands.

The islands of New Zealand thus differ in relief from the Mother Country: there is no counterpart in the British Isles to the central mountain axis of New Zealand and there is no counterpart in New Zealand to the lowlands of South east England or of Central Ireland.

The mountainous ridge forms with that of New Guinea a band of highland which lies on the Pacific Ocean side of the old tableland of Australia; the connection is made by the submarine **New Zealand Ridge** (Fig. 36). In this respect the ridge is similar to some degree to the mountainous uplift of the Andes on the Pacific Ocean side of the old tableland of Brazil and to the mountains of Japan near the old tableland of North-East Asia. This similarity is further emphasised by the volcanic area of North Island, which forms part of the ring of volcanic lands which circle the Pacific Ocean.

Climate. The table of temperatures, pressures and rainfall shows that the climate of New Zealand is on the whole cooler and more equable than that of Australia (p. 82), and at the same time warmer and more equable than the climate of the British Isles (p. 25).

The **pressure** changes are greater than those of Australia and show the connection between the higher latitude of New Zealand and the storm tracks which lie to the south of Australia.

The **rainfall** map (Fig. 35) shows the connection between rainfall and altitude and the comparatively drier area of the east side corresponds to the comparatively drier area on the east side of

NEW ZEALAND CLIMATE.*

	MONTHS.												YEAR
	1	2	3	4	5	6	7	8	9	10	11	12	
AUCKLAND.													
T.	50	52	56	56	63	66	67	67	65	60	55	53	59
P.	+6	-9	-15	+9	+13	+10	+6	+8	+18	+8		+18	+6
R.	6.3	6.4	5.4	5.0	1.1	5.2	7.5	5.8	1.0	2.9	4.0	3.6	54.2
WELLINGTON.													
T.	50	50	50	51	56	63	63	63	62	56	50	46	55
P.	-3	-14	-30	-14	+7	+2	1	1	+12	+3	7	+10	3
R.	3.8	4.1	3.9	2.8	3.0	1.4	3.3	3.9	5.5	2.7	6.4	4.3	44.2
CHRISTCHURCH.													
T.	44	43	50	52	59	66	62	62	63	55	47	43	54
P.	-4	-15	-37	24	+1	6	4	-5	+2	4	6	+12	-7
R.	1.7	2.9	4.1	1.7	1.0	0.5	0.9	1.1	1.8	1.4	1.5	0.9	19.5
DUNEDIN.													
T.	43	43	49	55	61	62	60	63	60	57	47	44	54
P.	—	-6	-28	-22	+5	+7	-12	—	+7	—	-1	+17	2
R.	1.0	5.6	2.8	3.9	2.6	3.0	0.8	3.8	2.3	1.0	3.0	1.7	31.5
N. ISLAND AVERAGE.													
T.	49	49	52	55	57	61	61	62	60	56	53	49	55
R.	5.7	2.9	4.3	4.1	4.2	2.8	2.6	2.7	2.9	3.2	5.2	5.2	45.8
S. ISLAND AVERAGE.													
T.	43	45	48	52	55	58	58	59	57	52	48	44	51
R.	4.5	2.6	4.7	3.8	3.8	2.7	4.2	3.8	3.1	3.2	4.1	4.9	45.4

PERCENTAGES OF RAINFALL DURING THE SEASONS.

	Winter (12-2)	Spring (3-5)	Summer (6-8)	Autumn (9-11)
Auckland	30	21	34	15 *
Wellington	27	20	20	33
Christchurch	28	35	13	24
Dunedin	26	30	24	20
North Island	30	28	18	24
South Island	26	27	24	23

* See explanation of numbers on p. 82.

Great Britain. Rain falls at all seasons in New Zealand although at Auckland there is a tendency to a summer maximum (table, p. 104), while further south the summer season tends to be drier. The averages for the whole of each of the larger islands show how evenly the rainfall is distributed. The wet winds from the north-west correspond with the wet south-west winds of the British Isles.

The temperatures in New Zealand range from over 40° F. in July to nearly 70° F. in January; and in the British Isles the temperatures are about 3° lower than those in corresponding months in New Zealand.

New Zealand has about 2000 hours of sunshine a year, about as much as Italy.

CULTIVATION.

DISTRICT.	GRASS-LANDS.		GRASS-LAND PRODUCTS.	
	Native, in thousand acres	Cultivated.	Wheat. in thousand quarters.	Oats.
Canterbury	3831	2813	489	714
Otago	6268	1366	163	484
Southland	2023	1111	13	509
Marlborough	1988	427	4	13
Wellington	1272	2856	12	73
Auckland	3583	2995	5	8
Rest	3600	3363	10	77
Total	22,565	14,031	606	1878

Vegetation. --The heavy rains towards the west of the islands, and the comparatively large areas of upland make New Zealand partly forest and partly grass-land.

The proportions of land under grass and the proportions of the crops are shown in the table, which emphasises the fact that the lowland districts of Canterbury, Otago, Southland, and Auckland are the grass-land regions, while the distribution of sheep and cattle in these districts and in Wellington and Hawke's Bay gives evidence of the uplands.

Cereals are chiefly grown in South Island.

The total grain available for export is just over a million bushels, of which a large portion is oats, and this forms a small amount in comparison with the grain produce of Australia (p. 87).

Ranching.—The lowlands and uplands are the ranching areas. The number of sheep, etc., reared are given in the table below.

The ranching products are chiefly wool, sheepskins, tallow, and frozen meat; and butter and cheese. The quantities exported are included in the table. More than 90 per cent. of the butter and cheese, and more than 80 per cent. of the wool is sent to the United Kingdom.

With about one-fifth the cattle of Australia, New Zealand exports one-third the quantity of butter and one and a half times the quantity of cheese.

With one-fourth the number of sheep of Australia, New Zealand produces about one-fourth the quantity of wool, and exports nearly one-half the quantity of frozen mutton.

DOMESTIC ANIMALS AND PRODUCTS IN NEW ZEALAND

	Cattle in thousands	Sheep	Butter in million lbs	Cheese
Auckland	574	2515	12	1
Taranaki	267	615	17	8
Hawke's Bay	180	3197	3	
Wellington	300	4520	13	5
Total North Island	1411	10,853	45	14
Marlborough	10	961		
Nelson	39	943		
Westland	21	30		
Canterbury	112	4325	3	1
Otago	121	2481	1	
Southland	95	1370	4	7
Total South Island	497	10,128	7	8
Grand Total	1818	20,981	52	22

Other products.—New Zealand flax (phormium fibre), is produced in Wellington. Kauri gum is dug from buried forests and is exported from Auckland for the purpose of making varnishes.

Coal is found extensively and a small amount is exported to the United States, but this is counterbalanced by the large import from Australia (p. 94), as the home supply is insufficient for home needs. Gold is mined mainly in **Westland**. Much of the gold in New Zealand lies among the stones in the bed of the streams and

therefore New Zealanders use a special dredger, which is a flat-bottomed boat made to carry the requisite machinery for lifting the gold-bearing gravel from the bottom of the water.

NEW ZEALAND TRADE.

EXPORTS.			IMPORTS.		
Article.	Quantity.		Article.	Quantity in £1000.	From.*
Wool	10 ⁶ lbs.	155	Apparel	768	
Grain	10 ³ bush.	1173	Boots and shoes	262	U.S.A. (12)
Frozen meat	10 ⁶ lbs.	233	Cotton goods	724	
Flax	10 ³ tons	28	Drapery	345	
Gold	10 ³ oz.	531	Hardware	302	
Kauri gum	10 ³ tons	10	Hosiery	100	
Butter	10 ³ cwt.	318	Pianos	101	Germany (48)
Cheese	10 ³ cwt.	152	Iron and steel	1380	
			Kerosene	147	U.S.A. (98)
			Seeds	130	Germany (10)
			Tobacco	371	U.S.A. (45)

* Most of the imports and exports depend on the United Kingdom or Australia; important exceptions are noted in this column; the figures in brackets are percentages.

Trade and communications. - New Zealand deals largely with the United Kingdom and with Australia in the articles enumerated in the table.

The system of railway lines across North Island and on the plains of South Island is shown on the map (p. 102) and the steamer routes are shown (p. 64) in connection with the rest of the world.

SUMMARY.

1. New Zealand is scantily populated.
2. The islands are mountainous, forested on the west, and grass covered on the uplands and on the east.
3. Not exactly the antipodes of the United Kingdom, yet in climate, wind direction, etc., New Zealand is the antipodes of the mother country.
4. It produces raw materials and food stuffs.
5. It has a remarkable volcanic area in North Island.

QUESTIONS.

1. Contrast (a) the products of North and South Islands: (b) the natural resources of New Zealand and Australia. (U.N.Z.)
2. Give some account of New Zealand with special reference to its climate, relief, resources, industries and chief towns. (I.C. Com.)
3. Contrast (a) the products of the North and South Islands: (b) the natural resources of New Zealand and Australia. (Auck. U.)
4. Describe the configuration, climate and vegetation of the South (Middle) Island of New Zealand. (L.U.)
5. What are the principal industries of New Zealand? With whom does she trade chiefly? What is the usual route employed? (U.S.)
6. Write a descriptive sketch of New Zealand dealing with its position, physical features, climate, chief cities, government and people. (Alb.)
7. A steamer arrives in Wellington in November with a full cargo from London. After discharging she takes on board a fresh cargo and leaves again at the end of the month for London. Mention eight probable items of each of her cargoes and state the routes she would probably take coming and going. (N.Z. Ed. D.)
8. What are the chief exports and imports of New Zealand, and where are the chief seaports situated? (C.P.)

25. The Neighbouring Islands.

1. Record the climates of New Guinea, Fiji, New Caledonia.
2. Explain why the west coast of New Zealand should in general be (a) warmer, (b) wetter, than the east coast. To what extent has the difference in climate on the two coasts affected the natural vegetation? (N.Z. Ed.D.)

The islands of the Pacific Ocean.—North of Australia, and separated from it only by a shallow sea, lies the island of **New Guinea**. To the east of Australia and apparently connected with New Zealand by the submarine ridges shown in the map, Fig. 36, are festoons of islands, which rise from comparatively shallow water. On an ordinary map these islands seem scattered without connecting links, but they all lie westward of the great depths of the ocean on a submarine plateau which connects New Zealand with Australia and extends beyond Australia north-westwards by the East Indian Islands to Asia.

British possessions.—The parts of these islands which belong to the British Empire are the Territory of **Papua** (British New Guinea), **Fiji**, and the **Tonga or Friendly Islands**.

Papua is more than three times the size of Tasmania and is about nine-tenths the size of New Zealand. There are about 600

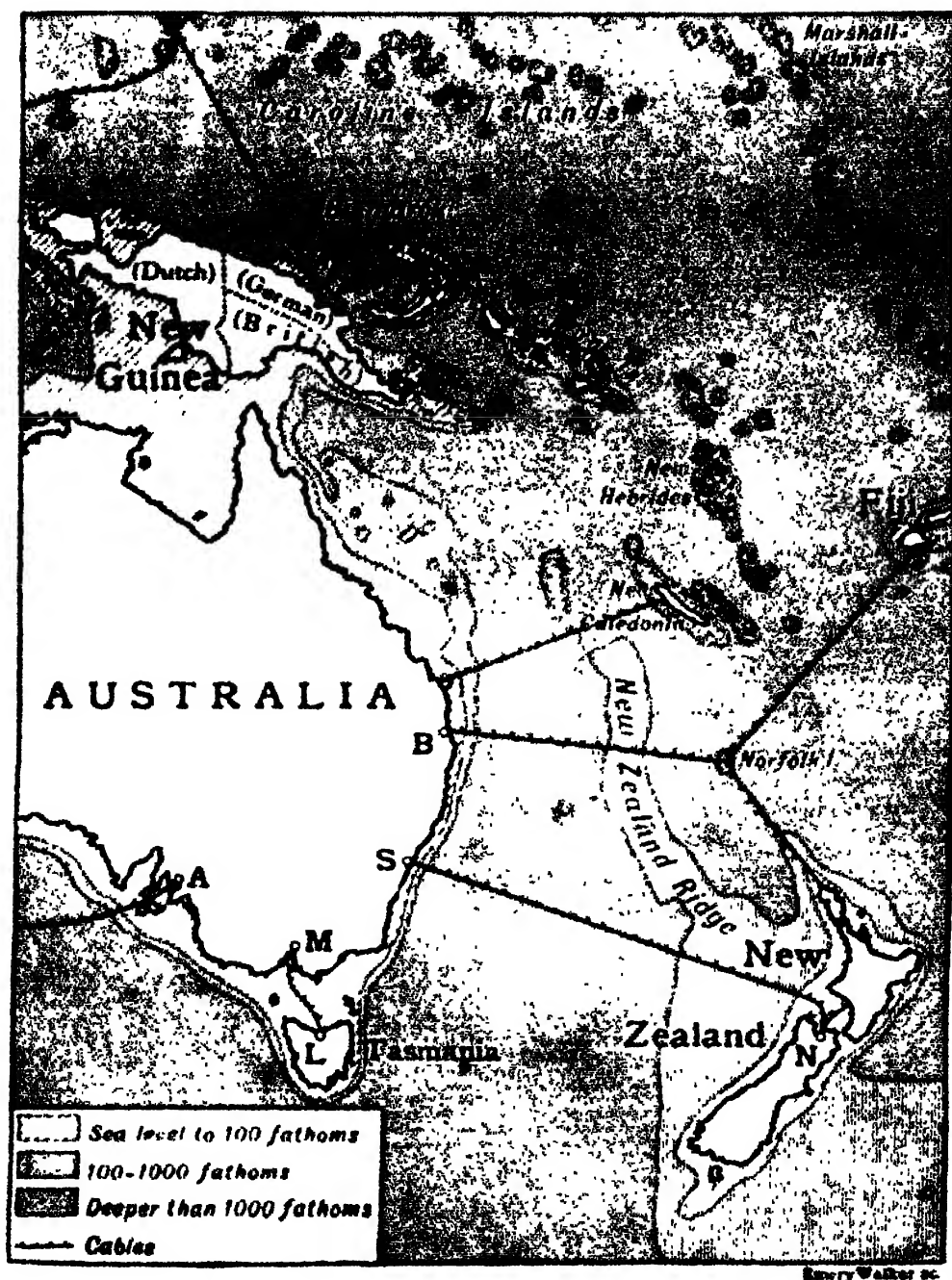


FIG. 36.—THE OCEAN FLOOR, EAST OF AUSTRALIA.

Europeans and a native population of about one-third of a million. The chief products are trepang, copra, pearl shell, pearls, and some gold : and there are valuable timber trees in the island, which lies within the area of the tropical forests.

Fiji consists of a group of about 200 islands of which the largest **Viti Levu** is about the size of Jamaica in the West Indies.

The islands grow sugar, tobacco and maize, and export copra to New South Wales and sugar to New Zealand and Canada.

Tonga consists of three groups of islands on the same ridge as Fiji and have an export of copra valued at about an eighth of a million pounds.

Islands belonging to European powers. In New Guinea there is a Dutch portion to the West and a German portion to the north of the British area. The products are similar to those of the British portion.

The **Bismarck Archipelago**, parts of the **Solomon, Caroline** and **Marshall Island** groups shown in the map (p. 100) are German and their produce is mainly copra and tropical timbers.

New Caledonia is French and has exports of nickel ore and copra. The **New Hebrides** Group is administered jointly by France and Great Britain, and has trade in copra.

Samoa consists of a group of islands some of which are German and the remainder form part of the colonial empire of the United States : copra is an important product.

Ocean cables. **Norfolk Island** is British and is mainly important for the cables which touch there and connect New Zealand with Australia and both these colonies with Canada, by way of Fiji and the lonely **Fanning Island** which lies about the centre of the Pacific Ocean. This cable route forms a portion of the **All Red** cable which girdles the world and touches only on British territory.

SUMMARY.

1. The islands in the Pacific Ocean are connected together by comparatively shallow seas.

2. Outposts of the British, French, German, Dutch and United States colonial empires meet in these islands.

3. The main products are copra and bananas.

4. The "All Red" cable goes from Canada to Fanning Island, then to Fiji, to Norfolk Island, and there branches to Australia and New Zealand.

26. Prominent Physical Features.

1. Examine Fig. 38. Note the appearance in relief of the Australian Alps, the Blue Mountains (N.S.W.), the Darling Downs, and the Darling Range. Write a short contrast between the East and West coastal lands.

2. Compare the appearance in relief of New Zealand and New Caledonia and New Guinea.

3. Refer to Fig. 28. If a flat sheet of cardboard were laid on the relief model of Eastern Australia shown in Fig. 38; what height would it be above sea level? How would the cardboard slope? How many of the peaks would touch the cardboard slope? How many of the peaks would touch the cardboard? Compare Tasmania with this region. Compare the Appalachians with this region. What do you notice?

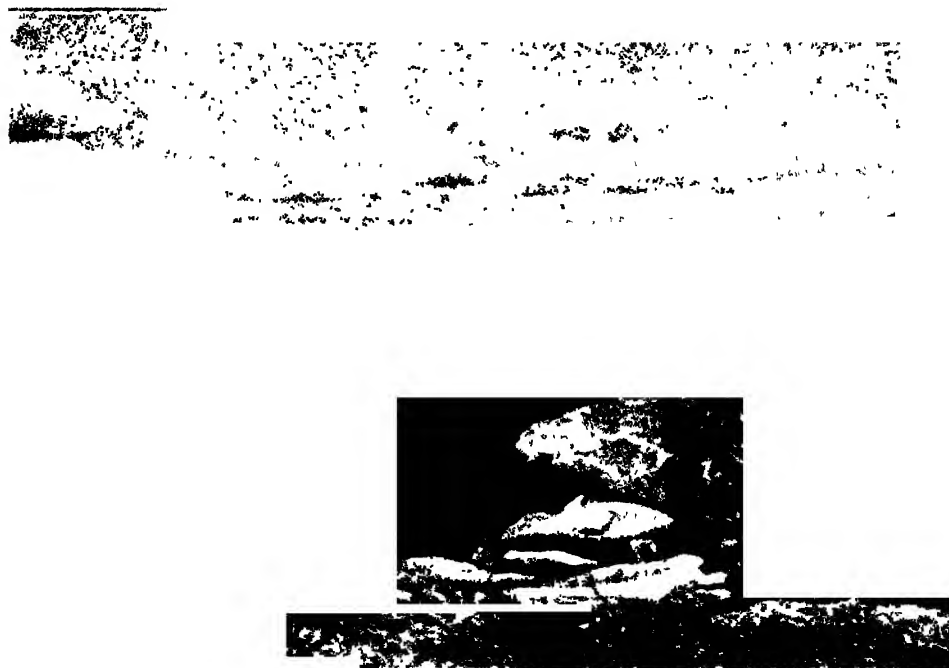


FIG. 37.—A VIEW OF THE MOUNTAIN TOPS OF S.E. AUSTRALIA.

Old tablelands.—Australia, like South Africa and the Deccan, consists of an old tableland with scarp edges above the sea level. The regularity of the coast, for example, along the Great Australian Bight, evidences the great age of the plateau. The widespread presence of the precious minerals shows that the



FIG. 18.—AUSTRALANIA: RELIEF.

surface rocks are ancient and the general structure of the rocks confirms this.

The South Eastern plateau edge.—On the South East the plateau rises from the central depression and then slopes rapidly to the sea.

The rivers commence in steep-sided gorges and at first have narrow valleys : they are young rivers.

Fig. 37 shows a typical view over the Eastern plateau : the tops of the peaks are all about the same level and the whole mass of upland is an old plain or almost plain (*peneplain*) which has been dissected by the rivers. Tasmania and the Apalachian regions of the Eastern United States are similar dissected peneplains.

Underground water.—Fig. 30 shows the extent of the underground water. This water is frequently warm and when tapped by a bore gushes forth in large quantities, as shown in the picture (Fig. 32). These supplies of water have made possible, ranching on the arid inland districts of Australia also the great stock road from South Australia to Western Queensland : they correspond to the oases in the desert and consequently camels are used for transport across the dry interior. In New Zealand (North Island) the underground water rises spontaneously as geysers.

Volcanic regions.—The outbursts of underground water in geysers is evidence of activity similar to that of volcanoes. The geysers occur in the volcanic district of North Island, near **Taupo**. Many of the volcanoes of New Zealand are extinct and large portions of the country are covered with lava : thus showing that the islands were once much more disturbed by volcanoes.

Volcanic activity usually occurs on the borders of sunken areas, and this activity in New Zealand shows that between New Zealand and Australia there has been a sinking of land which has now been covered by the ocean. This fact, combined with the festoon line of the high ridges through New Zealand and New Caledonia to New Guinea, forms an example of a Pacific Ocean coast line. The folded mountains occur along the ridge, and behind this, away from the ocean, lies the old tableland of Australia. The Japanese archipelago resembles in this respect the New Zealand archipelago.

On the American shores of the Pacific Ocean the Gulf of California, the island of Vancouver, and the coast-ranges stretching north and south from San Francisco, are other examples of the fact that mountains on the edge of the Pacific Ocean form festoon-like

ridges which are separated from the main mountain mass by long narrow valleys.

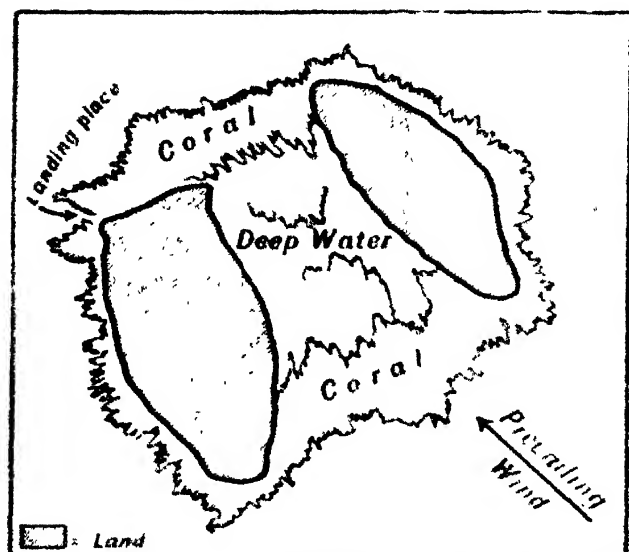


FIG. 39.—HERVEY ISLAND.

Coral deposits.—The Pacific Islands, and the Great Barrier Reef of Australia, furnish evidence of the activity of the coral polyp which causes lines of coral detritus to rise above sea level and form islands or barriers.

In Figs. 39 and 40 two typical coral islands are shown with their enclosed area of deep water and the reefs joining the land.

Aitutaki was expected

to be useful as a naval harbour, but the lagoon is too shallow and the boat entrance is too small. Ships which call at the island wait outside the lagoon. The coral reef is so low that thousands of tons of sea-water are thrown over it by the waves every second and this surplus water runs out to sea by the two narrow channels shown in Fig. 40 with great force.

Glaciers.—In New Zealand, in South Island, there are among the Southern Alps many glaciers of which the largest, the Tasman Glacier, is

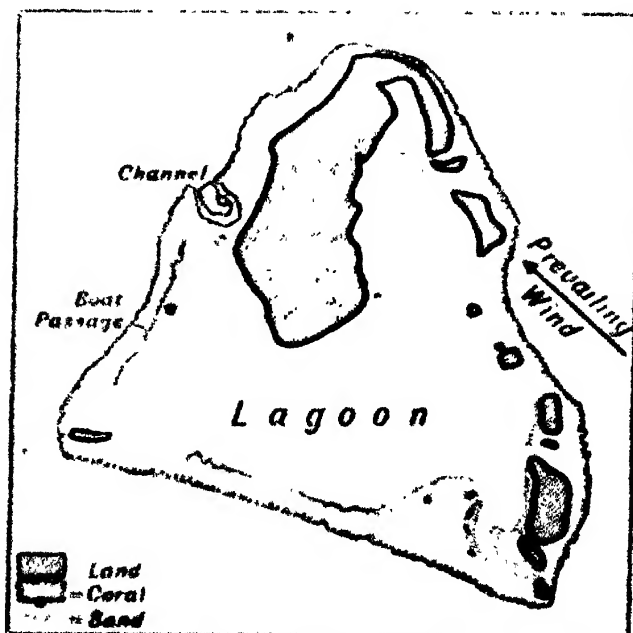


FIG. 40.—AITUTAKI.

said to be the largest glacier in the world outside the Polar Regions.

Southwards from New Zealand lies the continent of Antarctica, which appears to consist of a high snow-covered plateau, from which descend many glaciers. Between New Zealand and Antarctica the sea contains a belt of floating pack-ice, but further south than this the explorer comes to the open Ross Sea and then reaches the Ross Ice Barrier, which is the edge of a vast plain of floating ice. On the west side of this is Mt. Erebus an active volcano.

SUMMARY.

1. The rocks of Australia are ancient.
2. South east Australia is a plateau dissected by many rivers, which flow at the bottom of deep gorges.
3. In Australasia there is much underground water ; there are consequently artesian bores in Australia and geysers in New Zealand.
4. Volcanic activity is felt in North Island (N.Z.)
5. South Island (N.Z.) has mountains high enough to have glaciers ; there are no glaciers in the British Isles.

QUESTIONS.

1. State clearly the route that would be taken by (a) a sailing ship, (b) a steamer, proceeding from London to Melbourne. (L.C.Com.)
2. Compare the economic products of New South Wales and Victoria with those of Natal and Cape Colony, and account for any similarities and differences. (L.U.)
3. Draw a map of the Australian Continent, indicating the location of the principal towns and trunk railway routes. (U.A.)
4. What is the origin of artesian water, and of what importance is it to Australia ? (U.A.)
5. What are geysers ? Explain the antecedents and special conditions which give rise to geysers. (U.A.)
6. Write a description of the geographical features of North Island (New Zealand) or Ceylon, noticing also its climate, its productions, and its commerce. (C.P.)
7. Divide Australia into natural economic regions, and give full reasons for the divisions you adopt. (C.P.)
8. Describe the telegraphic communication between England and the Australian Colonies. (L.C.Com.)

9. Through what parts of Australia does the Tropic of Capricorn pass? Compare the climates of the east and west coasts and account for the differences. (U.S.C.)

10. Divide Australia into climatic regions and give the reasons for selecting the divisions you make. (L.U.)

11. Draw a map of the eastern third of Australia, showing the coasts, the rivers Darling, Murray, Fitzroy, the tropic of Capricorn. Name, without showing the boundaries, the three eastern states, insert and name the capital of each, and show the railway line joining the three cities. (L.U.)

12. Where is (1) gold, (2) coal, found in Australia and New Zealand? Name and state the position of two towns, each in a different state, which have become important because of gold-mining, and other two, also in different states, which have become important because of coal mining. (L.U.)

13. Draw a map of New South Wales, showing (1) the western river system; (2) the artesian water-bearing areas; (3) the chief mineral areas. (U.S.)

14. How do telegrams addressed "via Pacific" go from Wellington (1) to Sydney, (2) to London? By what other route can they be sent? What are the advantages of the Pacific route? (N.Z. Ed. D.)

15. You send a cable message from your nearest telegraph office to London, ordering goods to be sent out by one of the mail boats. Trace the course of one series of wires along which your message could be transmitted, and indicate the route traversed by the parcel from London to your home. (U.M.)

16. Illustrate by a sketch a trade route between Adelaide and San Francisco, and indicate the names and positions of the chief ports on the route. (U.M.)

17. What are the chief ports of the Commonwealth of Australia other than the State capitals, and what are the principal products of the districts for which they are outlets? (U.A.)

18. Draw a sketch map of Victoria, marking and naming the physical features. (U.A.)

19. Summarize briefly the more important physical features of the New Zealand archipelago. (N.A.)

20. Write an account of the Murray Basin showing its commercial value, and illustrate your answer by a sketch map. (U.A.)

21. Draw a map of the Murray River and its tributaries, showing adjacent railway lines and important towns. (U.A.)

22. State and describe the operation of the more important meteorological factors which control the summer and winter climates of Australia. (U.M.)

SECTION II: AFRICA.

27. The Continent of Africa.

1. Record the **area** and dimensions of Africa.
2. Record what fractions of the whole continent are occupied by British South Africa and Egypt with the Anglo-Egyptian Sudan respectively.
3. Record the estimated percentages of lowland, upland and mountain.
4. Record the distance from Cape Town to Cairo, from Zanzibar to Accra, from Tangier to New York, and from Cape Town to Buenos Ayres.

Position.—Africa is a south-pointing peninsula separated from Asia by the **Indian Ocean**, and from Europe by the **Mediterranean Sea**. Since the **Suez Canal** was opened it has been possible to sail completely round the continent, and the east coast lands are connected to Western Europe, to Australia and to Asia and Eastern America by direct steamer routes. The western coast lands are open to the Atlantic Ocean, so that practically the whole coast line of the continent is in communication with the rest of the world, and in this respect Africa has the advantage of Australia, the north-western coast of which is not regularly visited by steamers.

Size and population.—The area of Africa is about $11\frac{1}{2}$ million square miles, so the continent is four times the size of Australia. The sizes of the different states and the numbers of their populations are largely obtained by estimation, but there is about one-quarter of the continent which has some connection with the British Empire, and of this quarter British South Africa is over one-third. The population is largely native, the white people being most numerous in British Africa, and most numerous in comparison with the natives in the Cape of Good Hope, the Orange Free

State, and the Transvaal. The total white population does not approach that of Australia.

States.	Area in 1000 sq. mi.	Per- centage of area of Africa.	Population in 1900.		No. of Whites per 1000 of total.	Dense- per sq. mi.
			White.	Total.		
Cape of Good Hope	277	2.4	580	2410	240	8
Natal	35	0.3	97	1100	87	33
Orange Free State	50	0.4	143	387	370	8
Transvaal	111	1.0	207	1270	234	11
Rhodesia	440	3.8	15	1554	10	3
Total British South Africa*	1205	10.4	1135	7204	155	6
Anglo-Egyptian Sudan	950	8.3	—	2000	—	2
British W. Africa	480	4.2	3	16200	—	33
British E. Africa	402	3.5	3	8283	—	20
Total British Africa	3033	26.4	1141	33780	28	11
Egypt	400	3.5	200	11500	17	20
Morocco	210	1.9	—	5000	—	23
Algeria and Tunis	408	3.5	180	7058	26	17
Tripoli	390	3.4	—	1000	—	3
Congo State	900	7.8	3	30000	—	33

* Totals include Bechuanaland, etc. (p. 123).

Relief.—Africa south of the equator consists almost entirely of elevated land which reaches in the north-east into **Abyssinia** to flank the Red Sea. (Fig. 41.) In the north-west the upland stretches along the coast land of the **French Congo** through West Africa, and is broken by the valleys of the Congo and the Niger. From **Uganda** a belt of upland stretches away towards the north-west towards **Morocco**; between this ridge and that of the west coast lies the depression of the Chad basin. In the South African upland are the trench-like valleys of the Orange, and the Zambezi, and of the lake strip containing Tanganyika. This southern upland drops to the sea in terraces, and the traveller who aims at reaching the interior has everywhere to climb.

North of the equator the intervals between the branching ridges of upland contain the narrow trench of the Nile valley, the great

internal drainage basin of **Lake Chad** and the lowland containing the Niger Valley and reaching to the west coast in the neighbour-



FIG. 41.—AFRICA: RELIEF.

hood of the tropic of Cancer. The north-west corner of the continent contains the uplands of Morocco which are in line with the great upland ridge of the Alps-Carpathians-Himalayas of Eurasia.

Rivers and lakes.—The rivers of Africa are included in the table below :

	Length in Miles.	Port near mouth.
Nile	3,473	Alexandria.
Niger	2,600	Forcados.
Congo	2,800	Banana.
Orange	1,000	
Zambezi	1,900	Quelimane.

The Nile as an abnormal river. Most rivers slope continuously from the source to the mouth with a gradient which is

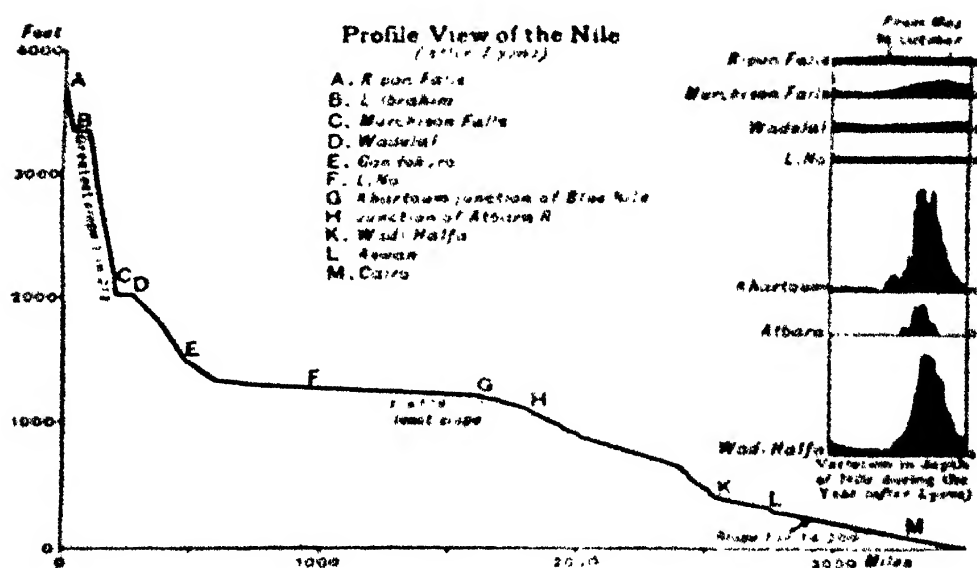


FIG. 42.—THE SLOPE OF THE NILE.

gradually slighter; they also usually have a catchment basin which is wider near the mouth than elsewhere. Fig. 42 shows the slopes of the Nile; the least slope occurs about the middle from just beyond Gondokoro to Khartoum. Fig. 46 shows the catchment basin of the Nile to be much wider in the latitude of Lake No than elsewhere. From Khartoum to the sea the river flows through a valley which is often less than ten miles wide and in which practically no rain falls. In this valley, from Wadi Halfa to the sea, lives the population of Egypt, a population more than twice that of Australia.

For the sustenance of so many people food-stuffs must be grown ; hence the **fellahin** (peasants) depend upon the Nile for the necessary water. On the lower and upper Nile this water is supplied constantly by canals to the fields. Fig. 42 shows the times at which the river is in flood at various points, and also the great height of the lower river in flood time in comparison with that at low water. At Lake No there is practically no flood season ; higher up stream there is a rise in the water level at **Murchison Falls** and at **Wadelai**, but the excess water overflows into the marshes between **Gondokoro** and Lake No where the slope of the river bed is slight, and therefore the current is sluggish. The **Bahr el Ghazal** has so slight a gradient as to be almost without current. Thus a constant supply of water from the **equatorial lakes** (Victoria, Albert, and Edward) flows past Lake No towards Egypt.

At Khartoum the **Blue Nile** joins the main stream from the upland of Abyssinia, and just north of the junction is the first evidence of the great annual flood which occurs from May to October, and reaches a maximum in August. The flood lasts on the lower Nile in Egypt from June to September.

The **Atbara**, also from the Abyssinian upland, practically is only a river in the flood season, and then adds to the amount of water in the river, so that from **Berber** to **Wadi Halfa** and beyond the flood water is more than 15 times in quantity the water at low Nile. The flood water for the crops, which is supplied to the fields by artificial channels irrigation, is not all required when it arrives, and a dam has been erected at **Aswan** to hold back in an artificial lake part of the surplus water, from about November till March, when it is required for the fields. Thus Egypt depends on the Nile for its water, and, as the floods are controlled more and more land in lower Egypt can be cultivated and the prosperity of the country increased.

The work of harnessing the Nile has been carried out by British officials working for the Egyptian government, and in the course of the work it was finally ascertained that the flood water of the Nile comes from **Abyssinia**, while the constant supply of water comes from the great lakes. At Aswan the dam has been built at a place where the river shallowed and navigation was impeded by rapids (usually called the **First Cataract**), and between Aswan and Khartoum are four other sets of rapids : these correspond to the rapids met in the other African rivers near their mouths, and so the Nile, like other African rivers, is of no great use as a

waterway into the interior. The rapids occur at those places where the interior plateau slopes rapidly down to the coastal plains of the continent.

The Victoria Falls.— The Zambezi River on its way through Rhodesia tumbles over a cliff edge and flows through narrow gorges to which the name of the Victoria Falls has been given.



FIG. 43. THE VICTORIA FALLS.

Photo. Prof. C. G. L.

The level of the river suddenly drops more than 300 feet, and the cañon or gorge is, at least 400 feet deep. In the cañon the river varies in height between high and low water by 40 feet (Fig. 43). The cañon is bridged, and in the days when Rhodesia will have become populous, it is probable that the Falls will be used to supply electrical power for many purposes.

The Congo is navigable between Stanley Falls and Stanley Pool, but the steep descent and rapids from Stanley Pool to the mouth prevent easy access inland from the sea.

Both the Congo and the Niger flow through regions which are

not well adapted to settlement by white men and, therefore, depend upon native labour for their importance.

SUMMARY.

1. Africa is a well-placed peninsula for sea communication.
2. Nearly one-third of Africa is British territory.
3. Africa south of the equator is an elevated plateau.
4. The African rivers usually have rapids near their mouths, and hence are not channels of communication from the sea inland.
5. The Nile water is essential to life in Egypt; the regular supply comes from the equatorial lakes, the flood supply from the Abyssinian mountains.

QUESTIONS.

1. Draw a map of Africa, carefully bringing out those features of its physical aspect which have rendered Africa the most isolated and inaccessible of all the continents. (U.A.I.)
2. Describe the course of the river Nile, and explain its importance to Egypt. What is the cause of the annual rise of the Nile? Why is Egypt almost a rainless country? (C.U.)
3. Draw an outline map of Africa, marking in the courses of the principal rivers, and the location of the chief lakes and the islands near the coast. (N.Scot.)
4. Describe the Nile Valley, pointing out where the water comes from and the difficulties of navigation. (C.P.)

28. Africa: Climate and Vegetation.

1. Record temperatures, pressures, rainfall for Africa from Figs. 13, 14.
2. Record the vegetation regions of Africa on an outline map.
3. Mark on this outline map, with the names of the products, those parts of Africa which produce articles, etc., named in Chapters 5, 10, 11, 12.

Climate regions. - There are two regions in Africa where the rainfall is slight; in Chapter 4 it was shown that these areas are the Sahara Desert and the Kalahari Desert with the land to the west of it. These areas lie to the east of, and rather nearer, the equator than the two high pressure regions shown in Fig. 14; they are close to the regions of the hottest summer temperature, as shown in Fig. 13. Between these regions lies that of almost constant rains, which is the region of equatorial low pressure and a

temperature always above 70° F. Between the almost rainless areas and the areas of constant rains lie areas of summer rains, where the temperature and pressure are both lower than those of the arid regions. On the coasts of the continent to the north and the south are the winter rain regions (Chapter 12), where the temperature is the coldest which occurs on the continent.

The rainfall of the continent.—The rainfall on the average through the months is given in the table below for selected places.

RAINFALL IN AFRICA.

Month.	Alex- andria.	Liberia.	Victoria Lake.	Walfish Bay.	Lourenço Marques.	Durban.	Pretoria.	Bloem- fontein
1	2	4	2	—	—	1	—	—
2	1	2	4	—	1	2	—	1
3	1	4	4	—	1	4	1	1
4	—	8	6	—	2	5	2	2
5	—	16	6	—	4	4	3	3
6	—	16	2	—	4	5	4	3
7	—	16	2	—	4	5	4	4
8	—	16	2	—	4	5	4	4
9	—	16	4	—	4	5	4	4
10	—	16	2	—	1	3	1	2
11	2	6	4	—	1	2	1	1
12	2	2	4	—	—	1	—	1

The rainfall for **Alexandria** should be compared with that for Algiers and Tunis (p. 49), and with that for Cape Town (p. 49); and that for **Liberia** and **Pretoria** with that for Lake Tsana (p. 54).

The figures are used to calculate the seasonal percentages shown in the next table, which shows the winter rainfall of Alexandria, the summer rainfall of Pretoria, Bloemfontein, and Durban, and Lourenço Marques (Delagoa Bay).

PERCENTAGE SEASONAL RAINFALL IN AFRICA.

Season.	Months.	Alex- andria.	Liberia.	Victoria Lake.	Lourenço Marques.	Durban.	Pretoria.	Bloem- fontein.
Winter	12-2	62	7	24	4	9	—	8
Spring	3-5	13	23	38	27	31	25	23
Summer	6-8	—	39	14	46	36	50	42
Autumn	9-11	25	31	24	23	24	25	27

The two tables show the differences between the rainfall on the east and west coasts of the continent : on the west coast there is a distinct separation between the regions of winter and summer rainfall by the regions of practically no rain at all, but on the east coast these two regions tend to merge, especially south of the equator. In the south the line which separates the region which has more than 50 per cent. rainfall in the six colder months from the region with more than 50 per cent. rainfall in the six warmer months, passes between **Port Elizabeth** and **Grahamstown**, along the **Zwartbergen**, in an east and west direction, turns north-west at **Amaltenstein**, crosses the Orange River north of **Springbok**, and reaches the coast about lat. 26° S. (Fig. 45.)

The figures for Lake Victoria and Lake Tsana show clearly the sources of the constant supply of water along the White Nile and of the great summer floods on the Blue Nile and the Atbara.

Vegetation regions.—The main features of the African vegetation are the desert and semi-desert regions of the Sahara and the Kalahari (p. 13), the tropical forests of Central Africa (p. 16), and the grass lands of the Southern plateau (p. 21), with the special products of the winter rain regions (p. 48).

The desert land to the south is less extensive than the Sahara, and has no similar feature to the strip of fertile land which is included in the Nile Valley. Although the temperature on the southern plateau appears on the map (p. 24) as about 90° F. in the summer months, yet this temperature is higher than the actual temperature experienced : owing to the elevation the actual temperature is at least 10° F. less on the average. At the same time the nearness of the ocean on the east, and the winds from that ocean which blow on-shore, provide a rainfall greater than that north of the equator, with the result that the Transvaal, Rhodesia, and the Orange Free State are grass lands with a distinct tendency to summer rains, and to tropical forest in the low-lying river valleys such as that of the Zambezi (p. 17).

This contrast in elevation between one side of the continent and the other makes it possible for Europeans to inhabit the interior uplands of Uganda and British East Africa, while it is impossible for Europeans to inhabit the lands of the Congo basin, or to live and work in comfort along the shore lands of British West Africa.

Cotton growing in Africa.—In Chapter 14 it is shown that while the United States are responsible for about two-thirds of the cotton crop, yet Egypt supplies about 7 per cent. When the crop

in the United States is smaller than usual, then the Egyptian crop assumes greater importance than is expressed by this number.

The suitability of the African climate and soil for cotton growing, and the similarity which exists between certain soils in the Sudan and Nigeria and those of the cotton-growing areas of the Deccan (India) have led to efforts to grow cotton elsewhere in Africa. These experiments are being carried out in the Sudan, in Uganda, and in Rhodesia in the districts of summer rainfall.

The table below gives the amount of the crops in millions of lbs.:

COTTON PRODUCTION.

	Million lbs.		Million lbs.
World's crop	9400	Uganda Protectorate	0.8
British Empire	1800	Nyasaland	1.5
Egypt	600	British E. Africa Protectorate	0.1
		N. Nigeria	0.3
		Gold Coast	0.1
		Sierra Leone	0.1
			2.9

The figures show clearly that the growing of cotton has not passed beyond the stage of experiment.

RUBBER.

	Thousand cwt.		Thousand cwt.
World's supply	1400	Uganda Protectorate	0.5
Brazil	600	Nyasaland	0.1
Congo State	120	Zanzibar	1.0
British Empire	97	British E. Africa Protectorate	1.0
		S. Nigeria	28.0
		Gold Coast	32.4
		Sierra Leone	2.4
		Gambia	0.2
		Total British Africa	65.6

Rubber.—The tropical forests of Africa yield rubber supplies. The British Empire as a whole supplies about 7 per cent. of the

world's stores, and of this about two-thirds is supplied by British West Africa : as in the case of cotton, the successful production of rubber is one of the possibilities of British Africa in the future.

SUMMARY.

1. The main factor in the climate of Africa is the rainfall.
2. Winter rains fall on the extreme north and extreme south.
3. No rain falls on the hot deserts, Sahara and Kalahari.
4. Summer rains fall on the equatorial edges of the deserts.
5. Tropical rains fall near the equator.
6. Savannah grass lands occur in Rhodesia and in the Anglo-Egyptian Sudan.
7. Egypt grows cotton.
8. West Africa produces rubber.

QUESTIONS.

1. What are the chief vegetation regions of Africa south of the Sahara? Indicate briefly the climatic factors which determine them. (N.U.)
2. Compare Africa and Australia with respect to structure, rainfall, desert regions, animal life. (Alb.)
3. Select the regions of greatest and least rainfall in Africa. Give reasons. (Sask.)
4. Describe shortly and account for the typical climate of (a) Cape Colony ; (b) the Congo Free State ; (c) Sahara. (C.P.)

The whole continent of Africa is comparatively unimportant for cereal growing as it does not produce as much as 5 per cent. of any cereal, yet it produces almost as much wheat as Australasia, and more barley and maize than that area (Chapter 10.). There are few farm animals in Africa ; cattle are particularly scarce since insects communicate deadly diseases to them and they easily succumb. Sheep are relatively numerous, but there are in Africa less than half the number of sheep there are in either South America or Australia.

The grass lands of middle Africa are still the haunt of wild animals of the deer kind, and they form, perhaps, the most important hunting ground of the world.

29. British South Africa.

1. Record areas, dimensions, temperatures, etc., for the constituent parts of British South Africa.

2. Record the distance from Cape Town to Durban, Pretoria, Kimberley, Bloemfontein, Bulawayo respectively.

3. Work out a comparison between the vertical exaggeration of Fig. 42 and that of Fig. 44. Write a short account of a boat journey for 1000 miles up the Nile from Cairo in contrast with a train journey of 1000 miles along the railway from Cape Town.

Position — British South Africa consists of the five parts named in the table (p. 118), and Basutoland, Swaziland, Bechuanaland, which together form about one-tenth of Africa, and lie to the south and south-east of that continent.

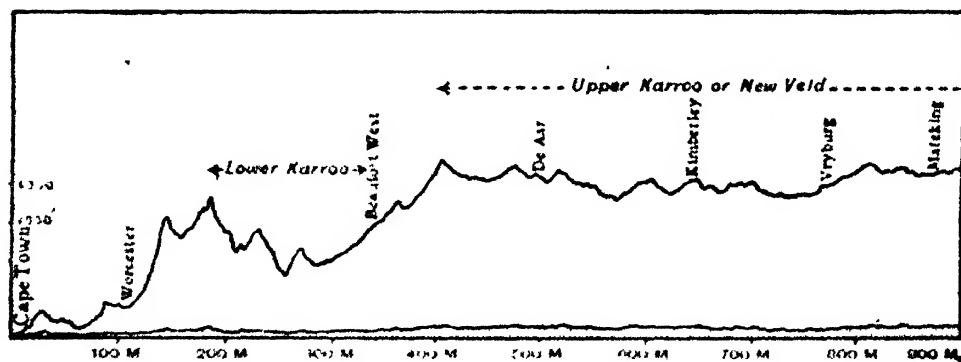


FIG. 44.—SOUTH AFRICAN TERRACES IN PROFILE. (After A. H. Wallis.)

Cape Town is roughly in the same latitude as Buenos Aires, Sydney, and Auckland: and owes its importance to its position at the southern end of Africa, since ships have always called at "the Cape" when passing from the Indian to the South Atlantic Ocean or *vice versa*. (Fig. 26).

Relief.—Cape of Good Hope and Natal rise from the sea shore in terraces, and beyond the topmost terrace lies the elevated plateau which comprises most of Africa south of the equator. Fig. 44 shows these terraces along the railway line. The upper line is exaggerated in height over 200 times, while the lower line is exaggerated in height over ten times. The plateau of the upper

Karoo is well marked. The water-parting separates the short rivers which flow to the Indian Ocean from the longer rivers which join to form the Orange River, and thus reach the Atlantic Ocean.

In some respects the valley of the Orange is similar to that of the Murray, with the Vaal as the counterpart of the Darling. The great difference lies in the fact that while the greater part of the Murray-Darling valley is less than 600 feet above sea-level, the major portion of the Orange-Vaal lies above 600 feet high and less than 6000 feet, with an average altitude of about 3000 feet.

BRITISH SOUTH AFRICA: CAPITALS: CLIMATE.

	MONTHS												YEAR.
	1	2	3	4	5	6	7	8	9	10	11	12	
CAPE TOWN.													
T.	55	55	58	61	64	68	70	70	68	63	59	55	62
P.	+2	+2	+1	+1		-	-	-	-	+1	+1	+2	+1
PIETERMARITZBURG.													
T.	65	67	72	74	77	79	81	80	77	72	68	65	73
P.	+2	+2	+1	+1	-	-	-	-	-	+1	+1	+2	+1
R.		1	1	3	4	5	6	3	5	2	1	-	31
BLOEMFONTEIN.													
T.	65	71	77	83	86	90	91	90	85	79	71	66	80
P.	+3	+2	+1	-	-1	1	1	-1	-	+1	+1	+2	+1
PRETORIA.													
T.	73	75	83	85	88	90	91	90	88	80	76	73	82
P.	+2	+1	+1	-	1	-1	-2	-2	-1	-	+1	+1	-
BULAWAYO.													
T.	74	76	84	86	90	91	93	91	88	81	77	73	83
P.	+1	+1	+1	-	-1	-1	2	-2	-1	-	+1	+1	-
R.	-	-	-	1	5	5	5	2	3	1	-	-	22

T = average temperature in °F.

P = variations in pressure in tenths of an inch from 30.00 inches, + indicating above 30.00 inches and - below.

R = total rainfall in inches.

Climate.—British South Africa has winter rains in the neighbourhood of Cape Town, while the rainiest region is along the coast

strip on the windward side of the edge of the interior plateau (p. 128). Passing north and north-westwards from Port Elizabeth, the land receives less and less rainfall until the semi-arid region of the Kalahari is reached. Passing coastwise northwards from the same place one finds that there is a distinct change; the rain tends to fall most heavily during the summer months.

British South Africa has on the whole but little variation in the other climatic factors. The barometer is nearly always high, and there is usually little difference between the pressure in the north and that in the south, e.g. in the table, p. 129, it appears that at Bulawayo the atmospheric pressure is usually about one-tenth of an inch lower than the pressure at Cape Town. In the case of the British Isles and New Zealand, the difference is usually about twice as much between the north and the south. The temperature is usually high, as shown in the map, p. 24, and in the table, p. 128, and the difference between summer and winter temperature is usually not so large as the difference in London, except in the interior, where at Bloemfontein the difference reaches 30° F., which is similar to the difference between the summer and winter temperatures in Central Australia.

"Perhaps the characteristic which most strikes the newcomer" to South Africa "is the remarkable absence of cloud and the abundance of sunshine. In fact, in the Union there are combined the sunshine of desert regions and the rainfall of a favoured land. The average cloudiness over the Transvaal Province, based on five years' records, is 31 per cent., and the actual duration of rainfall is 213 hours a year. The surface soil is usually dry, even within a few hours after rain, owing to the powerful radiation from the sun. For the same reason the air is seldom calm. There is always a breeze during the daylight hours, but at sunset the motion ceases. The climate may be briefly and popularly described as being genial, exhilarating, sunny, and dry, although intense dust-storms are infrequent."

Rainfall and elevation.—The annual rainfall map of the British Isles shows that the heaviest rainfall for the year in the British Isles tends to fall upon the uplands. In a slight degree the annual rainfall map of Australia shows that in the south-east corner the rainfall is higher on the uplands than on the coast lands, even when the coast land lies to the east, and is reached by the prevailing on-shore wind first.

In the case of British South Africa the annual rainfall map

shows that the nearer a place is to the east coast the heavier is the rainfall, and that the higher parts of the mountains do not receive a rainfall greater than the neighbouring coast lands.

Vegetation.—British South Africa tends to be a grass land ; the typical interior land, the veld, is a grass land which tends to be bare of vegetation in the dry season. It thus follows that animals can be reared and that cereals can be grown provided efforts are made to supply water when required. The numbers given in the tables, p. 69, show that in Cape of Good Hope and Natal there is about one horse to two white inhabitants, four head of cattle in Cape of Good Hope, and about seven head of cattle in Natal, per white man, in Natal about as many sheep as cattle, but in Cape of Good Hope a large preponderance of sheep.

CEREAL PRODUCTION IN 1000 QUARTERS.

	Wheat.	Oats	Barley.	Maize
Cape of Good Hope	310	276	115	1,096
Natal	1	1	1	584
Orange Free State	25	22	3	107
Transvaal	25	12	3	592
	361	311	122	1,379

The cereal production is shown in the above table, from which it appears that the chief crop is maize, and that only in Cape Colony are wheat, barley, and oats grown to any extent. So far as the animals and the crops in which the white man is particularly interested are concerned, British South Africa is very much in the agricultural position of Australia, where the farming is pastoral with only a slight tendency towards the arable stage, when sheep are driven off the land which is laid down for wheat culture. Large crops of maize, locally known as mealies, are much grown by the natives, who are strongly interested in arable farming in a primitive way.

The South African farmer produces for export no meat, about half the quantity of wool exported by New Zealand, and a small amount of oats and maize. The grain trade of South Africa is shown in the table, where will be seen that from one-third to half of the total cereal traffic is between one South African State and other

South African States. Except for maize sent to Britain, Belgium, and Germany, the remaining exports of grain are to countries across the Indian Ocean, and are in a sense local.

GRAIN TRADE IN 1000 LBS. SOUTH AFRICAN PRODUCE.

To	BARLEY		MAIZE		OATS	
	From	Cape of Good Hope	Cape of Good Hope	Natal	Transvaal	Cape of Good Hope
United Kingdom		28	2,733	10,558	8,778	5,632
India						2,200
Mauritius						870
Australia: Victoria		25	527			8,585
N.S. Wales			595	1,283		
Belgium			959	10,520		
Germany			370	10,280		
Other S. African States		767	3,400	39,100	17,000	11,000
Other countries		28	310	3,259	2,222	2,053
Total		848	8,000	93,000	28,000	31,000

IMPORTS OF MEAT, IN 100,000 LBS. FROM ALL SOURCES.

From:	BYZEE				MUTTON				OTHER KINDS			
	Cape of G. H.	Natal	Transvaal	Other	Cape of G. H.	Natal	Transvaal	Other	Cape of G. H.	Natal	Transvaal	Other
United Kingdom									28	20	3	23
Australia	27	93	3	60	20	110	2	40	5	9		6
Argentina	89	126	7	117	11	3	1	4	1			
U.S.A.									12	11	3	9
South Africa			2	142				4	1		1	6
Other countries		2							7	12	1	8
Total	116	221	12	328	41	113	3	78	54	52	8	52

All the South African colonies are shown in the meat table to be large importers of meat, especially from Australia and Argentina. Only in the case of Natal, and then only in the matter of mutton,

is there any great export of home-grown meat from British South Africa. On the other hand, the coast colonies, Natal and Cape of Good Hope, act as entrepôts for the supply of meat to neighbouring parts of Africa; to the British Colony of Mauritius, to Portuguese East Africa, and to German West Africa. This is shown in the table below.

EXPORTS AND RE-EXPORTS OF MEAT IN 1000 LBS.

From	BEEF.			MUTTON			OTHER KINDS.		
	Cape of G. H.	Natal	O.F.S.	Cape of G. H.	Natal	O.F.S.	Cape of G. H.	Natal	O.F.S.
To:									
Mauritius	55	37	—	18	6	—	—	—	—
Portu. E. Africa	—	90	—	—	20	—	—	27	—
German S.W. Africa	120	—	—	17	—	—	190	—	—
Other B.S. A. States	5,807	30,000	—	660	9,044	—	1,803	4,371	—
Other countries	—	4	—	—	8	—	57	26	—
Ships' stores	380	203	—	165	132	—	119	74	—
Total	6,452	30,304	88	1,160	9,210	258	2,229	4,498	560
% of total S.A.P.		46	*	9		*	4		*

* Not known.

The general conclusion, then, is that British South Africa is a farmer's country by nature, that with care and special attention to local conditions, the country might at least attain to the level of New Zealand as a farming land, but that at present farming is not well followed up; the comparatively small number of white people being interested in other pursuits than pastoral and arable farming. These pursuits are connected with mining for diamonds and gold, as will be seen later; so that the South African is on the whole a primary producer in that he manufactures very little. Two farming pursuits are to be noted: the production of tea, mainly in Natal, and the production of ostrich feathers, largely in Cape of Good Hope. Natal grows tea mainly for local consumption, but has to import more, as will be seen from the table. These imports of tea which are re-exported, are an additional example of the entrepôt trade of Natal, which has already been noted.

EXPORTS OF TEA IN 1000 LBS.

To :	From	Cape of Good Hope.	Natal.
United Kingdom :			
(i) Re-exports		4	—
(ii) S. Africa produce		—	283
German S.W. Africa		16	—
Portuguese E. Africa		—	9
Ships' stores		7	3
Other States, B.S.A.		754	1,879*
Other countries		2	8
Total		783	2,182†

* 40 per cent. South Africa produce.

† Natal tea production 2,180,000 lbs.

Cape of Good Hope has a trade with the United Kingdom of over a million pounds sterling per annum in ostrich feathers.

EXPORTS OF OSTRICH FEATHERS FROM CAPE COLONY IN £1,000.

To :

United Kingdom	£1,544
Victoria (Australia)	3
Germany	6
United States	90
Other countries	16
Total	£1,659

SUMMARY.

1. The major portion of British South Africa is a plateau about 3000 ft. above sea level.

2. The short slopes from the mountain to the south-east coast are similar in relief to those of South-East Australia.

3. Cape Town has winter rains : the rest of the country tends to rainfall in the hot weather, and the further west the drier the climate is.

4. British South Africa is mainly a grass land : suitable for agriculture. The natives provide for their own sustenance : the white man imports some food-stuffs, such as flour and meat.

5. In Cape of Good Hope there are ostrich farms.
6. In Natal tea is produced.

QUESTIONS.

1. Under the following heads, (*a*) countries, (*b*) chief towns, (*c*) products, write brief notes on the British possessions in Africa south of the Zambezi. (N.Z. Ed. D.)
2. What are the colonies which compose what is called British South Africa? Name the chief town in each. What do you know of their resources? (P.E.I.)
3. Draw a map of our colonies in South Africa, *or*
Describe the situation, physical features, climate and natural productions of one of them. (C.P.)

* 30. British South Africa. (*Continued.*)

1. Draw a sketch map of British South Africa: show the boundaries of the states, insert the capitals, and mark and name Kimberley, Johannesburg, Salisbury.

Insert the Zambezi and the Victoria Falls.

Mark the ports of British South Africa and add Lourenço Marques.

Show the railway lines from the ports inland (Map. p. 141).

2. Draw a map of the Indian Ocean to show South Africa and Australia. Insert upon the map the names of the articles which are sent from South Africa to Australia and *vice versa*. Which colony sends most goods to the other? What is the distance from Cape Town to Melbourne? Find by means of a piece of thread across a globe the shortest sea route from Cape Town to Melbourne: why is this route not followed by ships?

Minerals.—British South Africa is at present a **miner's** country. At **Kimberley** and in the neighbourhood of **Pretoria** are the **diamond** mines which supply the world. At **Johannesburg**, and in scattered places in the Transvaal and Rhodesia, are the **gold** mines. The Transvaal produces about 30 per cent. of the world's gold. **Coal** is mined at **Newcastle** in Natal, while at **Ookiep** in the west of Cape of Good Hope are productive **copper** mines.

In Rhodesia are many mineral deposits which are gradually being worked; a notable neighbourhood is the district near **Broken Hill**, where zinc and lead are mined. The production of minerals is shown in the table, from which it can be seen that British South Africa produces practically all the diamonds and about half the

gold produced in the British Empire, while it produces some coal and tin, and about one-tenth of the copper.

As in the case of Australia, there is no attempt to mine iron ore.

MINERAL PRODUCTION.

	Coal.	Diamonds.	Gold.	Copper Ore.	Tin Ore.
	Thousand tons.	Thousand £.	Million £.	Thousand £.	Thousand £.
Cape of Good Hope	134	6,748	—	523	—
Natal	1,300	—	—	—	—
Orange Free State	262	1,021	—	—	—
Transvaal	2,495	1,584	24	44	57
Rhodesia	94	11	2	7	—
Total B.S. Africa	4,285	9,364	26	574	57
Total Brit. Empire	300,000	9,374	49	—	—

SOUTH AFRICAN COAL TRADE IN 1000 TONS.¹

	From	Natal.	Transvaal.	Cape of G. H.
To				
India		31	—	—
Ceylon		6	—	—
Mauritius		12	—	—
Straits Settlements		9	—	—
Portuguese E. Africa		5	59	—
Other S.A. States		256	52	—
Other countries		22	6	—
Ships' stores		564	—	125
		995	117	125

¹ South African produce in all cases except 63 per cent. of the Ships' stores from Cape of Good Hope, which are re-exports: Cape of Good Hope imports from the United Kingdom 92,000 tons.

It has been seen (p. 63) that coal from the United Kingdom is sent largely over the Atlantic Ocean; Natal similarly supplies coal to some extent to the lands on the shores of the Indian Ocean. In the table it is shown that British South Africa exports about one million tons of coal out of the four millions which are mined. Cape of Good Hope imports coal from the United Kingdom largely

for the purpose of supplying ships, as Cape Town is an important coaling station.

Coaling vessels distribute Natal coal to India, Ceylon and the Straits Settlements and to Mauritius, while Portuguese East Africa is mainly supplied from the Transvaal.

Exports.—The total exports of British South Africa are valued at about three-quarters of one hundred millions sterling, of which about half consists of the produce of Cape of Good Hope, and a large part of the remainder comes from the Transvaal. The other colonies are of little importance in this connection. Most of the produce of British South Africa is sent to the United Kingdom, only about one-twentieth of it going elsewhere.

BRITISH SOUTH AFRICAN PRODUCE EXPORTED IN £1000.¹ *

	From	Cape of G.H.	Natal.	Transvaal	Rhodesia.	Total.
To						
United Kingdom		40,407	1,643	20,012	2,270	73,422
Rest of British Empire		60	62	1,286	122	1,530
Total British Empire		40,557	1,705	30,298	2,392	74,952
Germany		685	402	7	—	1,094
U.S.A.		101	3	5	—	109
German S.W. Africa		153	5	—	—	158
Portuguese Africa		9	14	59	3	85
Other Foreign		304	140	17	3	473
Total Foreign		1,252	573	88	6	1,919
Ships' stores		13	493	—	—	506
Grand Total		41,822	2,771	30,386	2,398	77,377

¹Orange Free State exports produce valued at about $3\frac{1}{2}$ million £, but no record is kept of the country of destination.

Imports.—The imports of British South Africa from overseas amount to about half the value of the exports of South African produce, rather less than half being taken by Cape of Good Hope and less than one-third by the Transvaal. The United Kingdom supplies about three-quarters of the imports, while Germany and the United States send to South Africa rather more goods than they take from her. The same fact is to be noted in the case of

the neighbouring parts of the British Empire across the Indian Ocean.

• BRITISH SOUTH AFRICA OVERSEA IMPORTS IN £1000.

Country of Origin.	Cape of Good Hope.	Natal.	Orange Free State.	Transvaal.	Rhodesia.	Total.
United Kingdom	8,804	3,881	1,426	6,000	871	21,132
India and Ceylon	288	427	57	234	35	1,041
Mauritius	300	42	24	40	2	417
Australasia	1,045	600	63	653	12	2,442
Rest of Brit. Empire	216	100	21	201	25	620
* Total Br. Empire	10,743	5,155	1,591	7,107	945	25,601
Germany	873	445	134	1,278	107	2,837
France	250	162	34	238	20	704
Holland	214	92	18	131	14	469
Sweden	160	111	45	134	15	465
Belgium	171	75	15	113	26	400
Rest of Europe	355	165	20	314	18	878
Total Europe	2,023	1,050	272	2,208	200	5,753
Argentina	344	105	17	225	6	787
U.S.A.	1,272	503	175	1,022	95	3,127
Other Foreign	493	234	73	294	44	1,138
Total Foreign	2,109	902	265	1,541	145	5,052
Grand Total	14,875	7,227	2,128	10,946	1,290	36,466

While the exports of British South Africa are mainly wool, maize, diamonds, gold, copper and ostrich feathers, *i.e.* raw materials for food or for manufacture, the imports of the Federation are largely food supplies and manufactured goods. The imports of meat are shown on p. 132. On page 139 are shown the other food-stuffs and the imports of clothing, etc.

Cape of Good Hope and the Transvaal buy the largest quantities. Clothes and clothing goods are sent mainly from the United Kingdom, but in the matter of food the neighbouring grass-land countries of the Southern hemisphere—Australasia and Argentina—supply most of the animal foods, while the United States supplies some wheat and wheat flour.

IMPORTS, IN £1000.

To	APPAREL.				COTTON GOODS.				WOOLLEN GOODS.			
	C. of G.H.	Natal.	O.F.S.	Trans.	C. of G.H.	Natal.	O.F.S.	Trans.	C. of G.H.	Natal.	O.F.S.	Trans.
From												
U. Kingdom	1,059	283	105	571	1,180	200	138	394	403	111	79	132
France	6	1	1	13	30	3	4	7	18	2	1	4
Germany	32	12	3	50	133	31	17	58	23	6	3	7
U.S.A.	22	8	—	25	—	—	—	—	—	—	—	—
Belgium	—	—	—	—	36	20	2	17	—	—	—	—
Other countries	9	10	52	23	43	31	4	24	7	3	6	9
S.A.P.	—	—	23	40	—	—	—	—	—	—	—	—
Total	1,128	323	184	722	1,422	204	105	500	451	122	89	152

To	BUTTER.				CHEESE.				WHEAT AND FLOUR.			
	C. of G.H.	Natal.	O.F.S.	Trans.	C. of G.H.	Natal.	O.F.S.	Trans.	C. of G.H.	Natal.	O.F.S.	Trans.
From												
U. Kingdom	6	3	—	3	—	—	—	—	—	—	—	—
Australia												
N.S.W.	4	11	—	—	—	—	—	—	—	—	—	—
Queensland	39	10	5	72	—	—	—	—	—	—	25	243
Victoria	38	73	—	—	—	—	—	—	173	58	—	—
S. Australia	—	—	—	—	—	—	—	—	474	101	—	—
New Zealand	17	65	2	44	—	4	—	3	—	—	—	—
France	6	17	—	—	—	—	—	—	—	—	—	—
Argentina	33	28	2	28	—	—	—	—	106	4	—	—
Holland	—	—	—	—	59	31	6	34	—	—	—	—
Canada	—	—	—	—	5	4	—	3	87	60	3	114
U.S.A.	—	—	—	—	—	—	—	—	102	27	9	36
S.A.P.	—	—	—	48	—	—	1	—	—	—	19	95
Other countries	31	35	1	43	6	5	—	6	25	5	2	1
Total	174	242	10	238	70	44	7	46	967	255	58	489

This table emphasises the fact that British South Africa is not inhabited by farmers or manufacturers, but rather by miners.

There are, of course, many farmers, but they do not produce all the food necessary for the white population.

Entrepôt trade.—As the most important part of Africa south of the equator, British South Africa, or rather Cape of Good Hope and Natal, the coast colonies, receive and distribute food products for the rest of South Africa. The entrepôt trade in meat and tea has been noted (pp. 133-4), and the following table gives details with regard to **rice** and **sugar**, although some of the sugar referred to is produced in Natal. This table shows how Cape of Good Hope supplies the lands on the west of the continent, and Natal the lands on the east.

RE-EXPORTS.

To	From	RICE, in 1000 lbs.		SUGAR, in 1000 lbs.	
		Cape of G. H.	Natal.	Cape of G. H.	Natal
United Kingdom -	-	—	—	—	176
German S.W. Africa -	-	93	—	355	—
Portuguese W. Africa	-	186	99	—	—
Portuguese E. Africa -	-	—	—	—	84
Other S. African States -	-	1,121	800	8,437	62,553
Other countries, including Ships' stores	-	695	190	75	37
Total	-	2,095	1,089	8,867	62,850

Communications.—Most of the South African towns are small; only Johannesburg and Cape Town have more than 100,000 inhabitants, of whom at least a third are natives.

For the purpose of collecting and distributing goods to and from the Transvaal and the comparatively quiet agricultural land of the Orange Free State, railway lines are necessary from the ports to the interior.

The accompanying map (Fig. 45) shows the progress which has been made in railway construction. The **Cape to Cairo Railway** has been made beyond Broken Hill, and is to serve as a main north and south line. From the ports **East London**, **Port Elizabeth**, and **Durban**, which are British, and from the Portuguese ports of **Lourenço Marques** and **Beira** lines are being carried first to the main centres of population and then beyond to reach the main route. In this

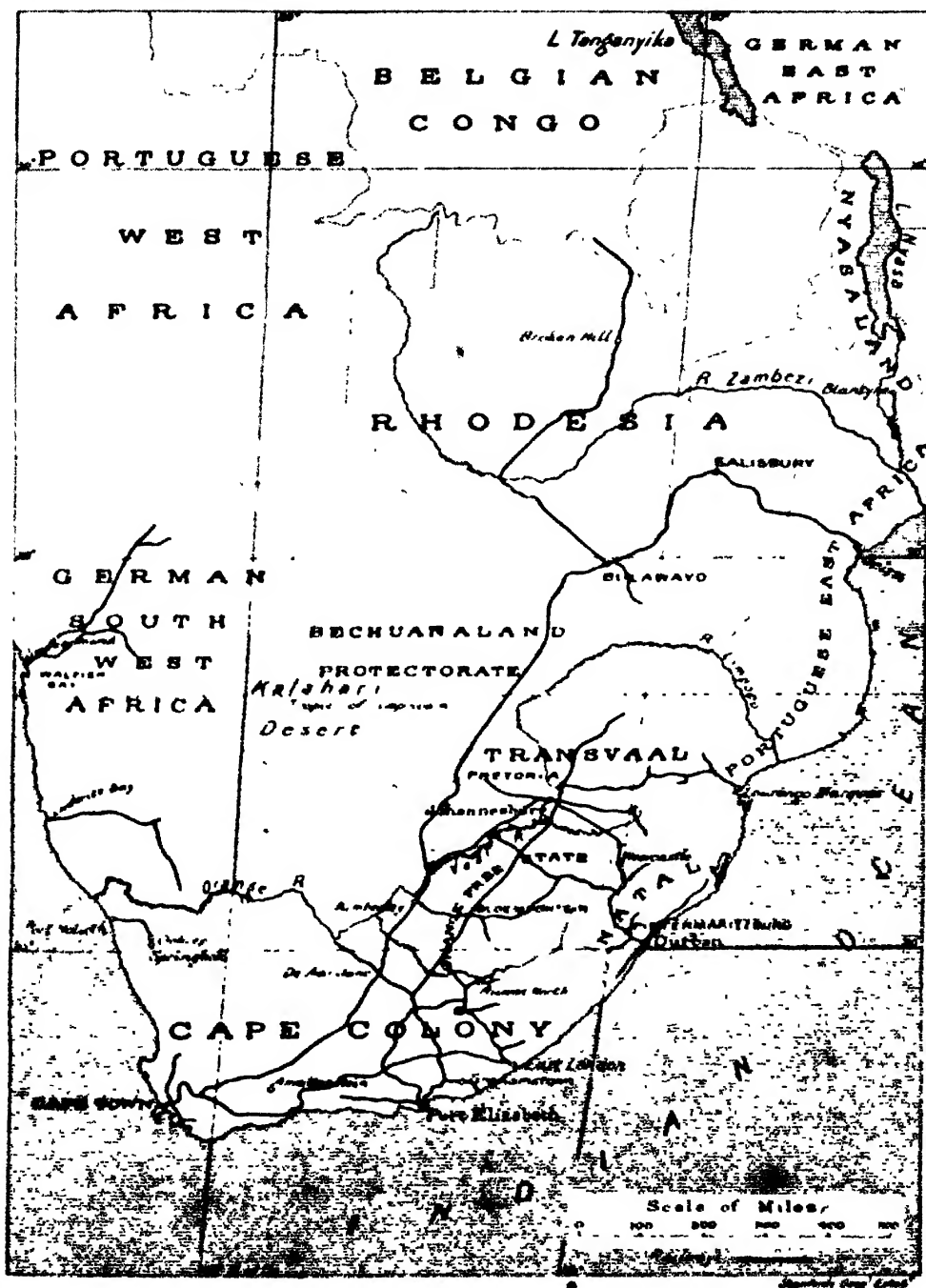


FIG. 45.—SOUTH AFRICA: RAILWAYS.

respect the eastern sea-board of South Africa is better supplied with lines of communication inland than the eastern sea-board of Australia (Fig. 34).

The African rivers are of little use for communication inland, and hence the country is almost entirely dependent upon its railway lines.

SUMMARY.

1. British South Africa is a miner's country.
2. It supplies the world with diamonds.
3. It produces gold, coal, copper and tin.
4. British South Africa trades largely with the United Kingdom.
5. Natal supplies coal to the shore-lands of the Indian Ocean.
6. Germany has about half the British South African trade with foreign countries.
7. British South Africa is not a manufacturing land.
8. Cape Colony and Natal supply neighbouring parts of Africa with foreign goods and with South African produce.
9. Railways are practically the only means of transport.

QUESTIONS.

1. Point out the character, distribution and occupations of the present population of British South Africa, and show how the different parts of the country are specially fitted for the industries pursued. (N.Z. Ed. D.)

2. What are the principal products of British South Africa? State from what localities each is derived. Mention the several lines of railway communication between the Transvaal and the coast. (U.A.)

3. Give the names and the boundaries of the British possessions in Africa south of the Zambezi; or, show the same on a map. Describe the climate and vegetable productions of any one of them. (Newf.)

4. What are the products of the chief divisions of British South Africa? (U.M.)

5. Describe South Africa, noting settlement, characteristics of rivers, climate and animal life. (Alb.)

6. Make a map of British South Africa, indicating the chief cities, mountains and rivers, and write a note on the industries. (Man.)

7. Where do you find in South Africa : (a) sheep ; (b) copper ; (c) diamonds ; (d) tobacco ; (e) wheat ? (C.P.)

8. Give an account of the principal coal fields at present worked in South Africa ; the principal markets for the coal produced, and the means of transport to those markets. (S.A.)

31. Egypt and the Anglo-Egyptian Sudan.

1. Record the main facts, climatic and otherwise, regarding this region.
2. Find the distances from Alexandria to Gibraltar and to Khartoum, and from Khartoum to Aden.

Position.—Egypt and the Anglo-Egyptian Sudan lie to the north-east of Africa, and comprise practically the whole of the catchment-basin of the Nile. The two areas together are larger than British South Africa, Egypt alone being about one-third the area of British South Africa. Egypt is more than three times as large as the United Kingdom.

Population.—The population of Egypt is one of the densest in Africa, while that of the Sudan is one of the scantiest. There are more people in Egypt alone than in the whole of British South Africa, more than twice as many as in Ireland or Scotland, Canada or Australia : but the number of Europeans is much smaller than the total population of Sydney, Adelaide, or Brisbane.

Relief.—Egypt consists of the flood plain of the Lower Nile and the neighbouring slightly more elevated desert land.

The Sudan includes the flood plain of the Upper Nile, and parts of the tributaries and the gradual slopes on both banks, as well as the fringe of the elevated plateau of South Africa which in this region reaches north of the equator. (Fig. 46).

Climate.—The temperature of this region is on the whole somewhat higher than that of British South Africa, while the barometric pressure is rather lower, with about the same variation from summer, when it is lowest, to winter, when it is highest. The rainfall on the Mediterranean coast land is slight (e.g. Alexandria, p. 124), in Egypt practically no rain falls, while in the Sudan rain falls in summer, and this rain increases in quantity as one passes towards the south. The rainfall of Zanzibar is notably heavy in the early summer, and is similar to that of India and Abyssinia in being partly due to the monsoon conditions of the Indian Ocean (p. 53).

NORTH-EAST AFRICA : CLIMATE.¹

MONTHS.													YEAR.
1	2	3	4	5	6	7	8	9	10	11	12		
CAIRO.													
T.	60	60	63	69	71	78	80	80	80	77	70	63	70
P.	--	--	-1	-1	1	-1	-2	-2	-1	-1	--	--	-1
R.	--	--	--	--	--	--	--	--	--	--	--	--	--
KHARTOUM.													
T.	71	75	79	86	92	92	88	88	88	88	81	73	83
P.	-1	-1	2	-2	-3	-3	-3	-3	2	2	1	1	2
R.	--	--	--	--	--	--	2	2	1	--	--	--	5
ADEN.													
T.	77	77	78	83	88	88	80	80	80	87	80	78	84
P.	--	1	1	2	2	3	4	-3	3	-2	-1	--	2
R.	--	--	1	--	--	--	--	--	--	--	--	--	1
ZANZIBAR.													
T.	78	79	81	85	86	86	86	86	86	85	81	80	82
P.	--	--	--	-1	-1	-2	2	2	2	1	-1	--	-1
R.	4	1	4	12	6	--	1	--	1	1	10	2	42

¹ Pressure variation in tenths of an inch.

In conjunction with the slight rainfall, and the steady barometer, this region has a succession of days of bright sunshine and almost cloudless skies. (Fig. 19). In the Nile valley the wind is usually from the north: this is due to the circling of the atmosphere round the low-pressure regions of Asia in an anticlock-wise direction.

Communications.—The Nile is navigable for vessels of light draught from the sea to the cataracts, and then from beyond the cataracts to **Duffa**. By the side of the river the railway runs, with one break, to Khartoum, with the branch line to **Port Sudan** on the Red Sea.

Production and trade.—Egypt is an agricultural land without minerals and important manufactures. On the flood plain the fellah can raise three crops a year, and consequently there is little need for the import of food-stuffs, the only import of this nature being a small amount of wheat and maize flour.

The cotton crop usually amounts to about 600 million lbs. and is grown on $1\frac{1}{2}$ million acres (p. 126). The chief areas are in Lower Egypt, in the districts of Gharbich ($\frac{1}{4}$), Behara ($\frac{1}{4}$) and Dakahliyah ($\frac{1}{4}$).

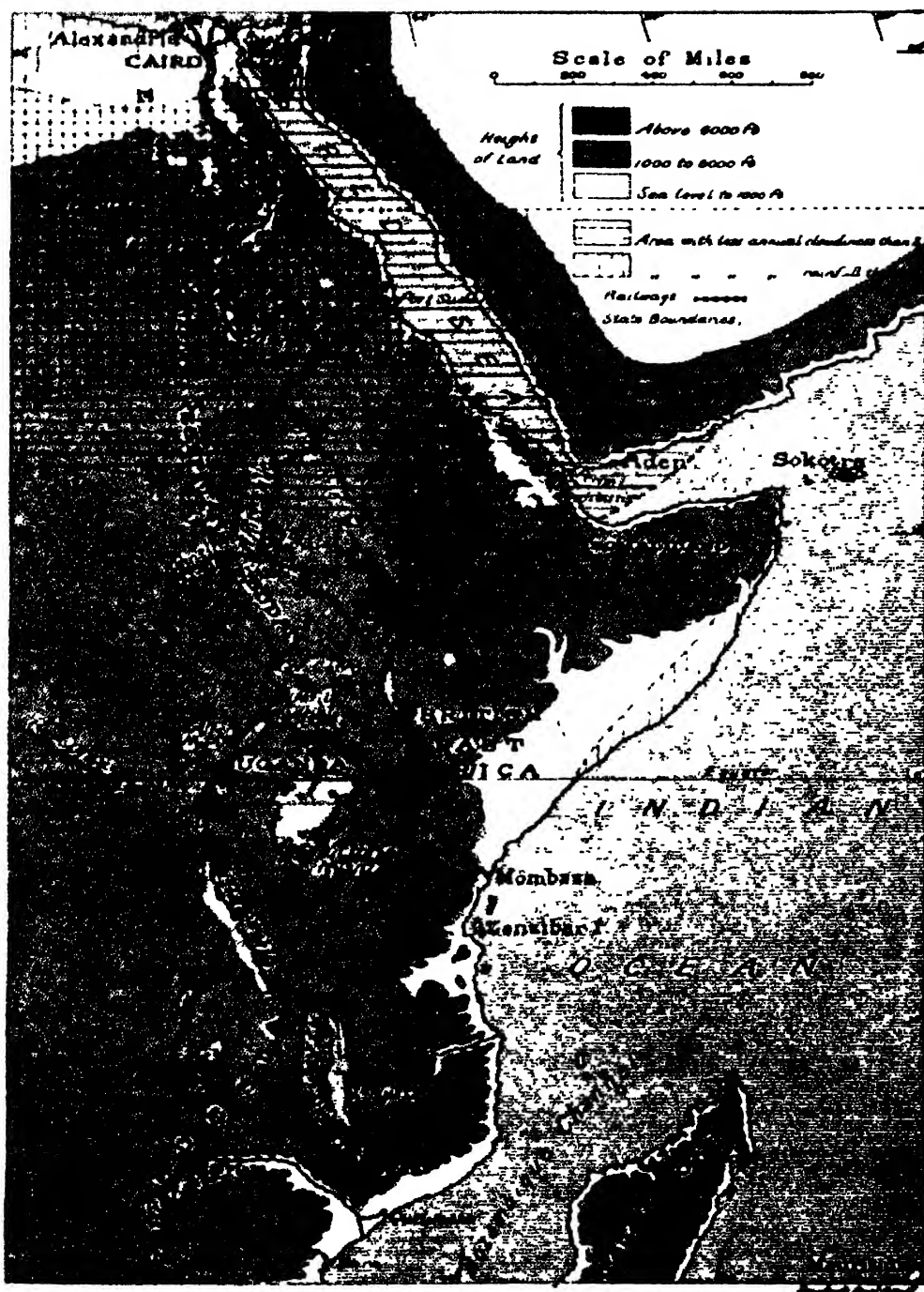


FIG. 46.—EAST AFRICA.

K

The farmer produces a surplus of cotton, and this provides the only export of any magnitude. The values of the total imports and exports of Egypt per annum each amount to between 20 and 25 million pounds sterling—less than half the trade of British South Africa. The particular countries which trade with Egypt are shown in the table, where it appears that the United Kingdom supplies about one-third of the imports, and receives about half the exports.

France is the next most important trader with Egypt.

EGYPTIAN TRADE.

	PERCENTAGES.			PERCENTAGES.	
	Imports.	Exports.		Imports.	Exports.
United Kingdom	33	54	France and Algeria)	12	7
Rest of British Empire -)	5	—	Greece - -	1	—
Germany - -	5	8	Italy - -	5	3
America - -	2	8	Russia - -	3	6
Austria-Hungary	8	5	Turkey - -	11	1
Belgium - -	4	—	Rest - -	11	8

The next tables give the details for the main articles, and these show that the main production of Egypt beyond her home requirements is cotton, which in one form or other accounts for nine-tenths of the exports, and this cotton is sent very largely to the United Kingdom. In return for this raw cotton Egypt imports cotton goods very largely, and these are supplied to the extent of nine-tenths by the United Kingdom.

EGYPTIAN EXPORTS.

Article.	Percentage of Total Exports.	Countries of Destination. ¹
Cotton - - - -	83	United Kingdom (52), Germany (8), France (8), Russia (7).
Cotton-seed - -	9	U.K. (87).
Cigarettes - -	2	Germany (38), U.K. (17).

¹ Numbers in parenthesis refer to percentage of each article dealt with by the country named.

EGYPTIAN IMPORTS.

Article.	Percentage of Total Imports.	Countries of Origin. ¹
Cotton goods - - -	13	U.K. (89), Italy (5).
Iron and steel goods -	7	U.K. (42), Belgium (28), Germany (16).
Coal - - - - -	5	U.K. (99).
Timber - - - - -	5	Sweden (37), Turkey (18), Austria (13), Roumania (13).
Textiles other than Cotton	4	U.K. (32), France (21), Italy (12), Turkey (12).
Wheat and Maize Flour -	5	France (65), Russia (12), U.K. (9).

¹ Numbers in parenthesis refer to percentage of each article dealt with by the country named.

The amount of coal imported from the United Kingdom is noteworthy, especially in relation to the shipping traffic which centres on Alexandria.

EGYPTIAN PORTS : TRAFFIC.

	PERCENTAGES.	
	Imports.	Exports.
Alexandria - - -	90	98
Port-Said - - -	7	1
Suez - - - - -	3	1

The hinderland of Alexandria.—The traffic table illustrates the fact that the main portion of the trade of Egypt passes through Alexandria. This is a striking commentary upon the arrangement of the lines of communication, which pass along the Nile valley by rail and boat. Most ports have a hinderland, or region which they serve for trade purposes, but few ports have a hinderland so definitely marked.

The hinderland of Alexandria is Egypt.

Egypt is the Lower Nile valley.

The Suez Canal.—In relation to the position of Port Said and its trade, one important feature lies in the fact that trading vessels which reach Egypt *via* the Red Sea, do not attempt to discharge cargoes at Port Sudan, although there is a railway from here inland. They pass into the Mediterranean Sea through the Suez Canal to take advantage of the superior facilities of Port Said, although the sea journey is thereby lengthened.

SUEZ CANAL TRAFFIC.

	Vessels.	Thousand tons gross.	Percentage.
British	2,425	11,911	62
German	588	3,108	16
French	253	1,249	7
Others	772	2,929	15
Total	4,038	19,197	100

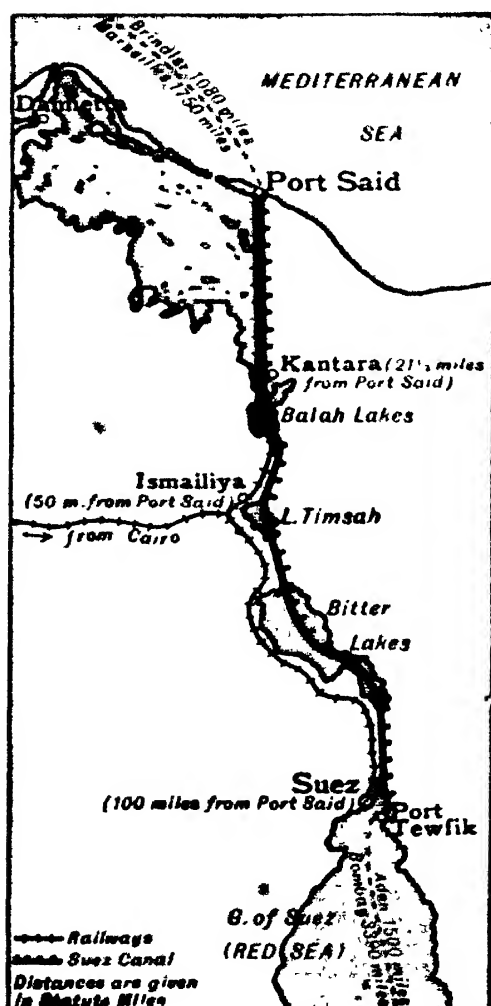


FIG. 47.—THE SUEZ CANAL.

Six vessels out of ten which pass through the Suez Canal fly the British flag, while those of Germany only amount to about one-fourth of the British ships. French vessels are third in order. As a rule the vessels which use the canal are large, the average tonnage being about 5,000 tons. The number of vessels which enter the canal per day is on the average 11, while the total traffic in the year amounts to about the same as the total tonnage of ships which enter per annum the two ports of London and Liverpool.

As many tons of shipping enter the ports of Hong Kong and London per annum as the tonnage of British ships which use the Suez Canal. There is, therefore, as great a concentration of shipping at the Suez canal as there is at London, Hamburg, Antwerp, New York, or Hong Kong, and more than at Liverpool, Singapore, or Marseilles.

Fig. 47 shows the connection

by the Suez Canal between the Red and Mediterranean Seas. Note the railway line to Cairo.

Neighbouring British territory.—Off the north-east of Africa are Aden, with Perim and Socotra. Aden has a denser population than that of the United Kingdom, there being over 500 people per square mile. Aden is a port of call, and a coaling station for the ships which pass down the Red Sea from the Suez Canal.

On the mainland are the Protectorates of Somaliland, Uganda, and British East Africa and British Central Africa (Nyasaland). These are parts of the Empire which lie along the shores of East Africa and reach inland to the interior plateau. They have, as a rule, rainfall in summer (Zanzibar, p. 144), and are inhabited by native people who are gradually developing civilised habits under British rule : e.g. in British East Africa and Uganda the natives are being taught how to raise cotton for the British market. From Mombasa to Lake Victoria there is communication inland by means of the Uganda railway.

In the Indian Ocean lies Mauritius, with a population as dense as that of Aden, and, like Aden, an important coaling station and port of call.

Mauritius mainly exports raw sugar to Cape of Good Hope, Natal, India and Australia.

India sends wheat, flour and rice to Mauritius, while the United Kingdom sends cotton and iron goods : both countries supply coal and compete with coal from Natal and Australia.

SUMMARY.

1. The Nile Basin makes two territories : Egypt and the Anglo-Egyptian Sudan.

2. These are hot, arid, irrigated agricultural lands ; they are self-supporting and produce a surplus of cotton.

3. These lands lack minerals and manufactures.

4. 100 vessels—60 of which are British and 15 German—pass through the Suez Canal every 9 days.

5. Aden and Port Louis (Mauritius) are important British coaling stations.

QUESTIONS.

1. Tell what you know of Egypt. (N. Scot.)
2. Draw a map of the Nile and its tributaries.
3. Name the countries of Europe which produce coal in large quantities. Which of these countries sends the most coal to Egypt? State the value of the total amount of coal imported into Egypt per annum.
4. Name the two chief articles imported into Egypt from each of the following countries : (a) England, (b) Turkey, (c) France, and (d) Italy.
5. Name the countries of the world from which Egypt chiefly imports (i) iron goods and machinery ; (ii) timber.
6. State approximately the total value of the exports of Egypt. Name any three of the exports, giving the value of each. With what countries does Egypt compete in the production of these three articles, and with what chance of success?

32. British West Africa.

1. Record the facts regarding area, climate, etc.
2. Find the distance from Accra to Cairo, Cape Town and Mombasa.
3. Estimate the percentages of the area of the catchment-basins of the Niger-Benue and of Lake Chad, which are British territory.

Area, position, etc. - The four territories of British West Africa lie along the shore of the westward projecting horn of Africa, slightly to the north of the equator, and the hinterland which is most extensive in the case of Nigeria.

BRITISH WEST AFRICA.

	Area in 1000 sq. miles.	Population in 1000.	Density per sq. mile.
Nigeria, Northern -	256	9,162	36
„ Southern -	77	4,444	58
Gold Coast -	119	1,486	13
Sierra Leone -	30	1,027	34
Gambia -	4	90	23
Total -	486	16,209	33

In some respects, relative to the equator and to the ocean, these colonies lie in a similar position in the northern hemisphere to the position of North-west Australia in the southern hemisphere. The



FIG. 48.—WEST AFRICA.

total area is about one-twenty-fifth of Africa, about one-seventh of British Africa ; and the population is about one-third of the population of British Africa. There are few white men, and the density of the population is about equal to that of Natal and greater than that of Egypt. Only the Congo State supports so dense a population in non-British Africa.

The great mass of the population is along the coast strips, as is shown by the great density of the population in **Southern Nigeria.**

Gambia is to be noted from its similarity to Egypt as the land in a river valley, in this case the Gambia.

Relief.—The coast lands are low, and the Niger Valley is low. North of the low coastal sill the land rises in the typical African way, by terraces to the level of the interior plateau. This plateau is not so high as that of South Africa. (Fig. 48.)

In the north-east is a portion of the depression round **Lake Chad**, the great depression of internal drainage in Africa.

Where the rivers break across the plateau edge there are rapids ; for example the **Barrakonda** rapids confine the navigation of the Gambia to that part of the river within the British Colony.

Climate.—The climate of the coast strips is shown by the details in the annexed table.

BRITISH WEST AFRICA : CLIMATE.¹

	MONTHS.												YEAR.
	1	2	3	4	5	6	7	8	9	10	11	12	
CALABAR.													
T.	82	83	84	83	79	79	78	78	79	79	79	80	80
P.	-1	-2	-2	-2	-1	-1	—	-1	-1	1	-1	-1	1
R.	3	4	8	12	16	16	16	12	16	16	8	4	131
ACCRA.													
T.	82	83	84	83	81	80	78	78	79	80	80	80	81
P.	-1	-1	-1	-1	-1	-1	—	-1	-1	-1	-1	-1	-1
R.	—	1	2	8	8	8	2	1	2	4	1	1	38
FREETOWN.													
T.	82	83	84	83	82	81	79	78	79	79	81	81	81
P.	-1	-1	-1	-1	-1	-1	—	-1	-1	-1	-1	-1	-1
R.	1	1	4	8	14	20	26	26	26	26	6	2	160

¹ Pressure variations in tenths of an inch.

The temperature is high, the pressure is low as is usual near the equator, and the rainfall is heavy, especially during the summer months. The district in the neighbourhood of **Accra** (Gold Coast) is noteworthy, as the rains are not nearly so heavy as those in the colonies to the west and to the east.

In the interior, on the plateau, the rainfall is less. As we travel from the coast northwards we pass through the area of summer rains and winter droughts—similar to that of the Sudan and of Rhodesia,—to the region of practically no rains, namely, the Sahara desert. Gambia has winter droughts.

The area round Lake Chad has, as a rule, a lower pressure than the coast strips, as the winds usually blow from the ocean on-shore, and thus produce the rains. In the interior the circulation of the atmosphere due to the same pressure arrangement causes a wind to blow from the desert towards the British territories along their northern boundary. This wind is dry and is known as the Harmattan.

The low pressure is most marked at the time when the monsoon conditions prevail in the Indian Ocean, and thus the winds are stronger and the coast rains heavier during the summer months.

Vegetation.—Where the rainfall is heavy on the coast lands, on the seaward slopes of the terraces, and on the lower lands in the valleys, the vegetation is dense, and includes trees and much undergrowth.

The main products of this forested area are mahogany and ebony (p. 16).

Further inland the forest gradually thins, until, as the total fall of rain is less, the land becomes grass covered, with trees at intervals, so that the general impression is of park-like land.

Further inland still, the trees disappear and the grass lands of summer rain regions are found.

Animals.—The natives who inhabit the grass land areas are cattle breeders.

Products.—Owing to the backward state of the people, British West Africa provides comparatively little for the world's trade. The raw materials for manufacture which this land supplies are rubber and timber from the tropical forests, ground nuts and various vegetable oils, chief of which is palm oil. In addition to these products, attempts are being actively made to grow cotton. This plant grows wild in West Africa and the British Cotton Growing

Association is fostering experiments so that a larger share of the cotton used in Lancashire shall be grown within the Empire. Northern Nigeria, Uganda, and the Sudan are the areas in which these experiments are being tried.

Apart from vegetable products the only important article exported is **gold** from the Gold Coast.

The table shows that West African rubber forms about one-sixth of the exports, and oil about one-third.

In return for these exports the colonies receive from the United Kingdom cotton goods to the extent of about two-fifths of the imports, and some coal. The important railway works finished and projected shown in the map, p. 151, cause importation of railway material.

BRITISH WEST AFRICA. TRADE WITH THE UNITED KINGDOM IN £1000.

	EXPORTS.				IMPORTS.	
	Rubber	Nuts.	Oils.	Timber.	Cotton Goods.	Coal.
Nigeria	303	281	1,357	254	905	15
Gold Coast	324	16	101	200	452	—
Sierra Leone	20	107	52	—	174	21
Gambia	10	13	—	—	65	—
					95	—
Total	657	417	1,510	454	1,691	36
Percentage of total Exports to, or Imports from, U. K. I.	15	9	34	10	41	1

Trade and communications. - Internal traffic is along the rivers where these are navigable, and by the railway where built (map, p. 151). External trade is largely with the United Kingdom, which takes two-thirds of the imports and sends about the same quantity of the exports. The major portion of the foreign trade is with Germany, while Holland and France are respectively important sellers and buyers.

WEST AFRICAN TRADE.

IMPORTS IN £1000.

From	United Kingdom.	Germany.	Holland.	Rest of British Empire.	Rest of World.
To					
Nigeria - - -	2,401	393	296	208	174
Gold Coast - - -	1,395	221	80	95	142
Sierra Leone - - -	489	110	15	23	105
Gambia - - -	165	30	2	54	170
Total - - -	4,450	754	393	380	591
Percentage of total Imports (B.W.A.)	68	11	6	6	9

EXPORTS IN £1000.

To	United Kingdom.	Germany.	France.	Rest of British Empire	Rest of World.
From					
Nigeria - - -	2,196	1,389	60	126	271
Gold Coast - - -	1,674	323	77	180	22
Sierra Leone - - -	207	292	6	78	167
Gambia - - -	33	4	290	36	68
Total - - -	4,110	2,008	433	420	528
Percentage of total Exports (B.W.A.)	56	27	5	5	7

Neighbouring islands.—In the South Atlantic Ocean lie Ascension Island and St. Helena, which are important in connection with British shipping.

SUMMARY.

1. British West Africa consists of tropical coast lands, with a hinterland of grass land verging into the hot desert.

2. The interior is typical African plateau, with the slopes down to the ocean.

3. The rivers have the usual rapids.
4. Accra has a unique rainfall.
5. The hinterland is visited by a hot wind from the north-east—the Harmattan.
6. Cotton can be grown in Nigeria.

QUESTIONS.

1. Give a short account of the British possessions on the west coast of Africa, to the north of Cape Colony, describing the physical features, productions, commerce, and peoples of each. (C.P.)
2. Compare the ports of the British Empire on the west of Africa with those on the east.

33. Non-British Africa.

1. Tabulate particulars about Morocco and Abyssinia.
2. Tabulate from a map in your atlas the parts of Africa which are colonies of European powers. Arrange these colonies with reference to their rainfall under the heads—regular rains: summer rains: no rain: winter rains.

General.—The British colonies in Africa provide examples of practically all the kinds of regions in the continent, so that it is possible to grasp the essential features of the other parts of Africa by reference to the British colonies.

Winter rain regions.—The typical winter rain region is Northern Egypt, which is here classed as British, as it is under British influence. Morocco, which is independent, the French possessions of Algeria and Tunis, and the Turkish dependency of Tripoli, have general climatic and vegetation features of the same kind.

Arid regions.—In the north, Middle Egypt is arid, and the extensions of Algeria and Tripoli towards the Sahara desert are similar, but lack the vivifying influence of a river like the Nile.

In the south, German South-west Africa and Portuguese West Africa are arid in a similar way to the arid region of south-western Rhodesia.

Summer rain regions.—Portuguese East Africa, German East Africa, resemble in many ways Uganda and British East Africa; while the Italian colonies of Somaliland and Eritrea resemble British Somaliland and the Anglo-Egyptian Sudan. Abyssinia has nearly 60 inches of rain per annum.



Regular rain regions.—The **Belgian Congo**, **French Congo**, the German colonies of **Togoland** and **Kamerun**, the French colonies of **Dahomey**, the **Ivory Coast**, and **French Guinea**, and the independent state **Liberia** resemble British West Africa in many ways.

French possessions in Africa.—In addition to **Algeria** and **Tunis**, France possesses parts of West Africa, a small state near the mouth of the Congo, and the island of **Madagascar**.

Algeria and Tunis, etc.—The north-west of Africa is somewhat similar to the north-east of the United States and the south-east of Australia in relief. There is the narrow coastal lowland, further inland the parallel mountain ridges and the high plateaus. In this case the district called the **Tell** lies between the ridges which are called the **Atlas Mountains**. Beyond the high plateaus lies the lowland—in this case the **Sahara** (Fig. 49).

	Area in Thousand sq. miles	Total Population in Thousands	European Population in Thousands
Algeria . . .	313	5232	730
Tunis	65	1826	140
Morocco . . .	219	5000	20

The densest population is in **Tunis**, but the numbers in the above table are only roughly approximate since the boundaries of these lands towards the desert are not precisely settled.

Agriculture in Algeria.—The farm animals of Algeria are shown on p. 70; the most notable is the sheep, from which wool is obtained to the extent of 280,000 lbs.

ALGERIAN PRODUCE, ETC.

DISTRICT.	Wine in Million gallons.	TREES IN THOUSANDS.			Olives in Million lbs.	Olive Oil in Million gallons.
		Orange Trees.	Date Palms.	Olive Trees.		
Algiers . . .	99	323	15	4,983	1.3	3.5
Oran	57	185	7	1,455	0.3	0.7
Constantine .	13	174	433	6,359	3.9	7.8
Sahara . . .	—	2	2,908	6	—	—
Total for Algeria	169	684	3,363	12,803	5.5	12.0

The above table shows specimens of the produce of Algeria, which are typical of the special productions of the **Mediterranean climate** of winter rains.

Except as regards **dates**, the Saharan district is unimportant ; the three coast districts produce **wine, olives and olive oil**, and contain trees which produce **oranges, figs, and bananas**.

As shown in the table, p. 71, both Algeria and Tunis grow wheat, barley and oats.

Algerian trade.—The total trade of Algeria amounts to about £18-million of imports, five-sixths of which are from France and about £14-million exports, five-sevenths of which go to France.

The United Kingdom has the largest trade—just over a million sterling—of any foreign country.

The export trade is mainly in **wine**, sheep, wool, fish, cereals, fresh fruit, and olive oil.

The fisheries employ about five thousand men, and send **sardines** and **anchovies** to France.

Other French possessions.—Tunis has products and trade like Algeria.

Senegal, French Guinea, French Dahomey, and French Congo supply rubber mainly to France, Belgium, and the United Kingdom. These possessions are in Tropical West Africa.

Madagascar, in the Indian Ocean, produces gold, rubber, and hides, and trades very largely with France.

SUMMARY.

1. The British possessions in Africa are typical in climate, people, and produce of all regions of Africa.

2. The most important parts of non-British Africa are Algeria and Tunis, which are French.

3. Algeria is typical of a Mediterranean state, and produces sheep, wine, olive oil, and oranges, figs, etc.

4. French West Africa, like British West Africa, produces rubber and palm oil.

QUESTIONS.

1. Draw a map of Africa south of the Zambezi. Insert the Limpopo, Vaal, and Orange Rivers, and the tropic of Capricorn. Name the self-governing British States and Rhodesia. Insert and name the capital of each, and show the railway lines connecting them. (L. U.)

2. Write a brief account of any two of the following : the Uganda railway, North Nigeria, gold-mining in Africa, Madagascar, Algeria. (L.U.)
3. Select either the basin of the river Nile or the west coast of Africa south of the Niger delta. Describe briefly the physical features of the country, and the character of the vegetation and climate in different parts, paying special attention to rainfall. (L.U.)
4. Divide Africa into regions according to rainfall, and indicate their limits. State the causes and the consequence of the difference in rainfall in the different regions and of the principal variations of rainfall in each region at different seasons of the year. a
5. Write on the prospects and resources of British East Africa. (Br. Col.)
6. Name and briefly describe the countries of North Africa situated on the Mediterranean Sea. (U.A.)
7. Give as many reasons as you can to explain why the interior of Africa remained so long unexplored. What European nations are engaged in developing the resources of the continent, and in what areas? (U.Pan.)

34. Special Physical Features.

1. Compare the relief of Africa (Fig. 50) with the relief of Australia (Fig. 37). Contrast the rivers in length and direction.
2. Draw a sketch map of Africa ; insert on it the water-parting between the Atlantic and the Indian Oceans.

The coastal edges.—Fig. 50 is a photograph of a relief model of Africa : notice the difference between the relief north and south of the equator, and the closeness with which the plateau approaches the sea. The rivers are marked with their cataracts where they break through the plateau edge. The coastal edge from the Limpopo to the Cape of Good Hope is not broken by rivers, and in this resembles south-east Australia, see Fig. 37, p. 111.

Exploration and travel in Africa.—During recent years probably more travellers have visited Africa and published records of their travels than have visited any other part of the world, and as a large portion of the interior of the continent is but imperfectly known, the following short summaries from records made by the travellers and explorers is important.

The Transvaal.¹—Examine Fig. 41 and note the relation of the relief of the Transvaal to the neighbouring areas. The

¹(“The Physical Features of the Transvaal.” By T. G. Trevor. *The Geographical Journal*, July, 1906.)



FIG. 30.—THE RELIEF OF AFRICA.

W.G.

L

Transvaal consists of four kinds of country, which are shown in the map, Fig. 51.

The high veld and the middle veld form the northward extension of the great South African plateau. The high veld has an altitude of over 5,000 feet above sea-level, is treeless and covered with grass: there are no ridges and valleys, but broad shallow hollows which contain water; there are few rivers. This area is

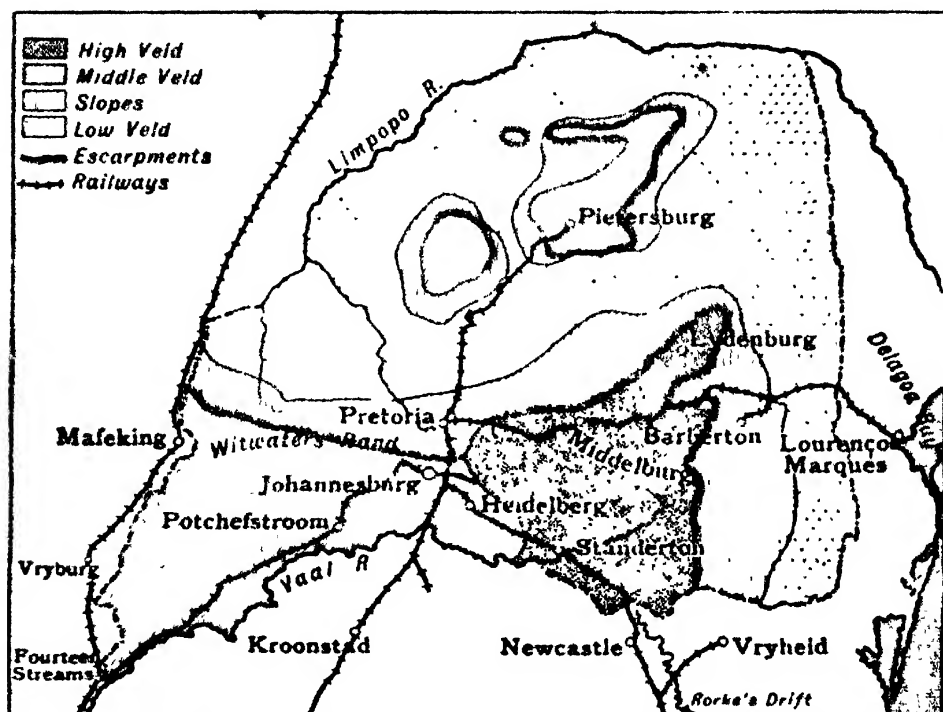


FIG. 51.—THE TRANSVAAL. (After Trevor.)

the best farming land and has temperatures ranging from 90° F. in the shade in summer to some degrees below freezing point during the nights in winter.

The **middle veld** is slightly lower than the high veld, has water-courses often with running water. The grass is of poorer quality and unsuitable for sheep.

From the plateau the land slopes downwards, sometimes in sharp escarpments, as at **Lydenburg**, at other places more gradually. In the river valleys cultivation of the ground is possible, and here occur the trees. Goats do best of all animals, sheep

do not thrive, and only grown cattle do well. Stock-rearing is not successful.

The rest of the country is low veld, usually below 3,000 feet in elevation. Here the rivers decrease in volume, at Rorke's Drift, for example, the river is sometimes quite dry in winter. The land provides good pasture, but the climate is hotter in summer than in the high veld, and frost is rare: animals suffer from disease. Europeans do not find this region healthy.

One important feature of the whole country is the absence of alluvial soil, and this is shown by the presence of gold in the rocks but the absence of gold in the river beds. Gold is not obtained in the river flats as in South Island (N.Z.), and there is little prospect of successful irrigation farming on the river flats as in Australia or India.

The Southern Kalahari.¹—Examine Fig. 41 west of the Transvaal, note the arrangement of the plateau. In this district there are two features: an immense grass-covered, sandy tract, with hard, stony veld—flat-topped ridges—at infrequent intervals. The rivers are bordered by thick belts of acacia trees.

The rain usually falls in the summer, from December to March, and amounts to about 9 inches per annum. After the summer-rains the grasses grow rapidly to a height of about 2 feet, and the growth is so thick that the sand is hidden.

The only industry is stock-raising: cattle, horses, sheep and goats thrive, and sheep and goats multiply rapidly.

It is suggested that artesian wells might be bored, as in Australia, and that in this way sufficient water might be found for extensive pastoral ranches.

The Sahara Desert.²—Examine Figs. 41 and 49, and note the surface relief of the desert.

The country the road crosses from the Mediterranean to Lake Chad is naturally divided into three parts: the northern part from Tripoli to Fezzan, with a regular rainfall during the winter months; Fezzan and the southern desert, where rain is either extremely scarce or unknown; and, finally, the southern end, beginning with the Tintumma plain, where the tropical rains are known by occasional thunderstorms.

In the country south of Tripoli there are no trees, and the winter

¹ *The Geographical Journal*: The Southern Kalahari. Nov., 1908.

² *The Geographical Journal*: "A Journey from Tripoli across the Sahara to Lake Chad." By H. Vischer. March, 1909.

rains fall in splashes and wash away the soil from the rock, and then the wind and sun crack the rocks, which gradually becomes more and more broken.

At Fezzan is a group of oases where water is always plentiful. In cases where the oases are not protected from the prevailing north-east wind the sand drifts over them and they disappear. The bordering palm groves then die off. A wall two feet high is sufficient protection against this wind, as the sand does not drift higher than this.

In some places the temperature rises regularly to 125° F. in the shade of the tents during the day.

The inhabitants are Arabs, who live by camel farming and by transporting goods for the traders: the caravans may include as many as 8000 camels.

The Zambezi and the Victoria Falls.¹—Examine Fig. 41, and note the upper Zambezi and the Limpopo. Near the source of these rivers it is supposed that there used to be large saucer-like depressions, which were once lakes, from which the water has disappeared as the rivers have forced away the plateau edge; the Zambezi has thus surmounted the obstacle at the Victoria Falls, 1000 miles from the coast, and at the Kebrabasa rapids, 360 miles from the sea; the river is 800 miles long above the falls.

The Victoria Falls are about one-third of a mile wide, and the water tumbles into a cleft in the rock, from which it emerges into a gorge and cañon about 40 miles long. (Fig. 52.) The falls consist of four parts, named from west to east, Leaping Water, Mair Fall, Rainbow Fall, and the Eastern Cataract.

Fig. 43 shows the Mair Fall in the background. On the left is Danger Point. The depth is here about 400 feet, and to the south the gorge is spanned by the railway bridge of the Cape to Cairo Railway.

SUMMARY.

1. The Transvaal has high veld (good farming land), middle veld, plateau slopes, and low veld.
2. The arid region of the Kalahari has about 9 inches of rain per annum, and after the rain the grasses grow about 2 ft. high.
3. The oases near Fezzan on the Sahara Desert tend to disappear as the wind drifts sand over them.

¹ "The Physical History of the Victoria Falls." By H. J. C. Molyneux. *The Geographical Journal*, Jan., 1903.

4. The Victoria Falls are on the Zambezi River, and form one of the great natural wonders of the world.

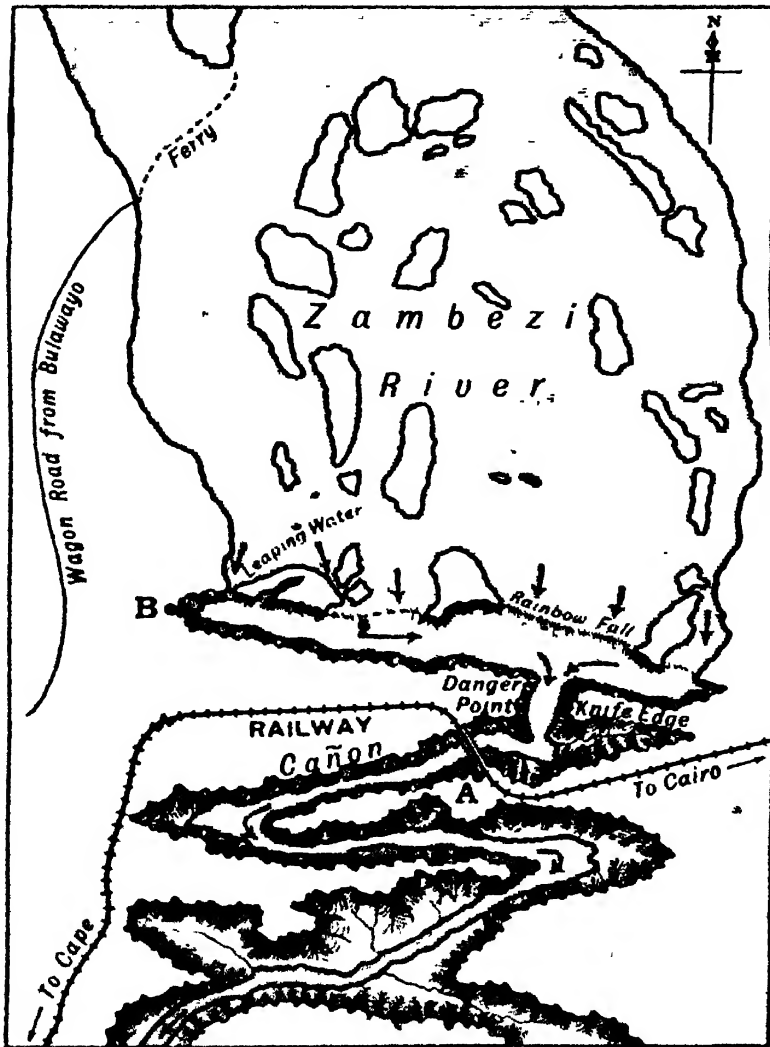


FIG. 52.—THE VICTORIA FALLS. (After Molyneux.)

QUESTIONS.

1. How is it that :

- (a) Rhodesia is likely to develop into an important country?
- (b) There are no centres of manufacture in Africa?
- (c) Egypt has only one long railway?
- (d) The Red Sea is an important thoroughfare?

(C.P.)

2. Name the chief possessions of France in Africa, and describe one of them. (C.P.)

3. Where in Africa are there important copper mines, ostrich farms, rubber forests?

4. Describe the physical features, climatic conditions, and natural products of the Transvaal. (L.U.)

5. Describe briefly the more important features of Egypt and the Anglo-Egyptian Sudan. Mention the chief characteristics of the Nile as regards its navigation and its water supply. Whence does the flood water of the Nile come? Where and to what extent has the usefulness of the Nile been improved? (C.S.C.)

SECTION III. ASIA.

35. The Continent of Asia.

1. Record the area and dimensions of Asia.
2. Record what fractions of the continent are occupied by British territory and by Siberia.
3. Record the estimated percentages of lowland, upland and mountain.
4. Record the distance from Cape Town to Calcutta; from Calcutta by sea to Shanghai, and also in a direct line; and from Colombo to Suez.

Position. Asia forms the eastern part of the great land mass which occupies the major portion of the land hemisphere (Fig. 2). Away to the north it reaches the Arctic Ocean and on the south-east reaches the equator. On the east and south there is oceanic communication with other parts of the world, and on the west there is water communication by the Mediterranean, and land communication viâ Russia. Unlike Australia, it is not isolated by the ocean, and yet, unlike Africa, it is not completely open to communications from all directions; for all practical purposes the northern shore lands are cut off from oceanic communication with the rest of the world. The eastern and southern shore lands are on the boundary between the land and water hemispheres (Fig. 2).

Size.—The continent itself contains about 16 million square miles, so that it is about half as large again as Africa; the size of the various countries is set out in the table below.

States.	Area in 1000 sq. miles.	Percentage of Area of Asia.	Population in 1000.		Proportion of White to Total.	Density per sq. mile.
			White.	Total.		
India	1530	9.7	115	283870	1 to 2600	185
Burma	237	1.7	—	10491	—	44
China	4277	26.7	20	433553	1 to 21700	101
Japan	174	1.1	5	54000	1 to 10800	310
Asiatic Russia	6327	38.5	—	22758	—	36

Both **China** and **Asiatic Russia** are larger than **Australia**; the British possessions are about half as large as the British possessions in **Africa**. The densest population is in **India**, and throughout the

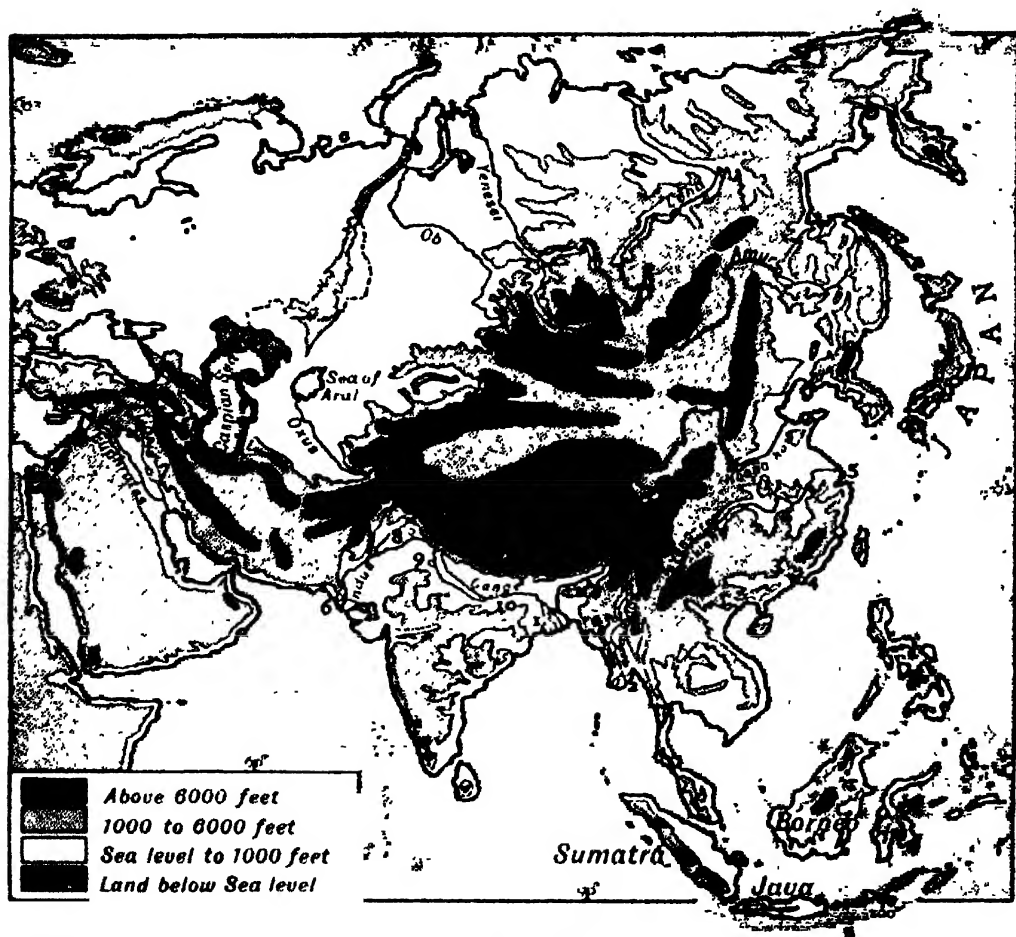


FIG. 53.—ASIA: RELIEF.

TOWNS—

- | | | | |
|--------------|--------------|------------|--------------|
| 1. Calcutta. | 4. Hongkong. | 7. Bagdad. | 10. Benares. |
| 2. Rangoon. | 5. Shanghai. | 8. Lahore. | 11. Hankow. |
| 3. Canton. | 6. Karachi. | 9. Delhi. | |

whole of the continent there is a very small proportion of white people in comparison with the dense population of the native races.

Japan is larger than the British Isles and has a population of about the same density.

Relief.—Asia consists largely of the wide area of mountain land

which stretches from Persia eastwards with varying width, and makes up much of the interior of China (Fig. 53).

From this mountainous area is an off-shoot to the south-east, which makes the **Malay Peninsula**. The elevated region drops abruptly from the Himalaya to the plain of the **Ganges**, and then to the south lies the upland region of the Deccan (Fig. 54).

The shores of the Arctic are notable for the widest coastal plains of the continent, and these are continuous with the wide northward stretching plains of Europe. These plains do not occur on the eastern and southern coasts, and the gap of lowland which runs north and south from the Gulf of Pechili has a counterpart in the depression of the Sea of Japan (Fig. 65).

Rivers.—The rivers of Asia are included in the table below, which separates those which flow through populous valleys from the others.

ASIATIC RIVERS.

THROUGH POPULOUS VALLEYS.			THROUGH SCANTILY-PEOPLED VALLEYS.		
	Length.	Area of Basin.		Length.	Area of Basin.
Ganges - -	1455	397,000 ^o	Amur -	2700	987,000
Indus - -	2000	3,600,000	Lena -	2860	909,000
Hwang-ho -	2300	387,000	Ob -	3235	1,151,000
Canton - -	—	—	Yenesei	2500	792,000
Yang-tse-kiang	3250	725,000			
Euphrates -	1600	260,000			
Irrawadi -	—	—			

The rivers whose valley floors contain in parts a dense population are marked by the large towns near their mouths, or on the stream. **Calcutta, Karachi, Rangoon, Canton, Hong Kong** and **Shanghai** are ports, and **Bagdad, Lahore, Delhi,* Benares** and **Hankau** are situated up-stream; in all these cities there is a great river traffic, but that of the Indian rivers is not so great as that of Hankau.

The **Indus** resembles the Nile since it flows in its lower course through an arid country and since the mouth is a delta; but it differs from the Nile in more important respects; the population is on the *lower* Nile, but on the rivers in the Panjab the floods on the Indus are not regular like those of the Nile, and the irrigation works are on the upper river for the benefit of the population in the immediate neighbourhood. A comparison of the two rivers

suggests, however, that the upper Nile region may become as populous and as productive as that of the upper Indus, while the lower Indus area might, provided the river could be confined to one bed definitely, be as populous and as prosperous as the lower Nile. The difference in the two rivers is seen in the history of the ports. Alexandria near the Nile delta is an ancient city, famed for its commerce for centuries; Karachi near the Indus delta is a new city which has grown up in consequence of the necessity for an outlet for the exports of the region, which are brought to the port by rail and not by river.

As in Australia and in Africa there are basins of internal drainage, namely, to the **Caspian Sea** and the **Sea of Aral**. As in the other continents also, this area is an arid region, but in Asia the main river, the **Oxus**, flows through a region of small population, which is gradually being brought into closer contact with the world of commerce as Russia develops her Asiatic Empire.

Asiatic Islands. --In addition to the island empire of **Japan**, and to the island dependency of **Ceylon**, the main islands are the **East Indies**. Most of the islands are crossed by, or are close to, the equator, and largely consist of elevated land. The Japanese islands form a festoon of land off the coast of the continent; such festoons are characteristic of the Pacific shores.

In most of the **East Indian Islands** there is evidence of volcanic activity, although in some cases the volcanoes are not active, and by this characteristic they show a close relationship with Japan and with New Zealand.

SUMMARY.

1. Asia is continuous with Europe and both continents form **Eurasia**.

2. Asia = $1\frac{1}{2}$ times Africa.

3. From Persia eastwards and trending north is mountain.

4. The northern shore lands are lowland.

5. Many rivers flow through populous valleys and have large towns on their banks and at their mouths.

6. China has the largest population, but India has the densest population in Asia.

7. The Asiatic Islands form festoons lying in a north and south direction.

CLIMATES OF EASTERN ASIA.*

	MONTHS.												YEAR.
	1	2	3	4	5	6	7	8	9	10	11	12	
SAIGON.													
T.	75	80	82	82	83	83	83	82	81	81	80	76	81
P.	- 10	- 12	- 12	- 16	- 20	- 20	- 20	- 23	- 17	- 13	- 12	- 10	- 15
R.	1	1	1	2	6	10	10	10	16	10	8	2	78
PORT ARTHUR.													
T.	18	25	35	50	63	73	77	77	67	58	43	30	51
P.	+ 38	+ 28	+ 10	- 2	18	- 30	27	- 25	- 5	+ 10	+ 20	+ 27	+ 2
R.	-	-	-	1	2	2	5	5	3	1	1	-	20
YOKOHAMA.													
T.	38	40	45	55	62	68	75	79	74	63	53	46	57
P.	+ 5	+ 5	+ 1	4	8	- 15	- 16	15	- 8	-	+ 7	+ 8	- 3
R.	3	2	5	6	5	6	8	4	9	9	4	4	65
VLADIVOSTOK.													
T.	8	12	30	40	51	60	70	68	62	48	30	18	42
P.	+ 25	+ 23	+ 6	- 4	- 16	- 20	- 22	18	- 4	+ 9	+ 16	+ 20	- 1
R.	-	-	-	1	1	1	2	3	2	2	1	1	13
OKHOTSK.													
T.	12	- 8	10	21	35	50	55	58	45	23	6	- 8	23
P.	10	- 6	- 6	- 11	- 16	- 20	- 26	18	- 10	13	- 15	- 15	- 14
R.	-	-	-	-	1	2	2	2	2	1	1	1	12

* For explanation of values see p. 82.

36. Asia: Climate and Vegetation.

1. Record temperatures, etc., for the continent (p. 171).
2. Record the vegetation regions of the continent.
3. Write a short summary of the climate and vegetation of those parts of Asia which are densely peopled.

Climate regions.—The arid regions of **Arabia**, **Iran**, **Turkestan**, and **Gobi** separate the Monsoon regions of the south and south-east of Asia from the colder regions with a variable climate which lie to the north. On the east coast these two regions meet in the neighbourhood of **Manchuria**, **Korea** (now called **Chosen**) and **Japan**.

The whole climate arrangements of the continent are profoundly modified by the in-swirl of the air round the "**Central Asian furnace-stove**" during the summer, and the corresponding winter out-swirl: this is the region of high pressure in winter and low pressure in summer (Figs. 22 and 23).

The figures in the above table show clearly the tendency for the region of summer rains to creep round the arid region on a coast land which has on-shore winds, which was noted in the case of South Africa (p. 130). All along the east coast the rain falls most heavily in the second half of the year, during the season when the pressure is least. The table also shows that at Port Arthur, Vladivostok and Okhotsk, when the temperature is below freezing point, there is practically no precipitation of rain.

The pressures at Saigon and Okhotsk illustrate respectively the equatorial and polar low pressure areas.

Port Arthur and Vladivostok agree in the great range of temperature and pressure which occurs in these places annually, and the difference between the range at these places and at Yokohama—where the range in both respects is about half—illustrates the effect of the Pacific Ocean on the climate of Japan.

The Monsoon countries are dealt with especially in Chapter 13, but the districts further to the west, where Asia approaches Europe and Africa, are shown climatically in the table below.

All the places named, except Smyrna, suffer variations in pressure due to the great area of extremely low pressure in summer in Central Asia; and all the places are practically arid, or almost rainless.

At Bagdad, Damascus and Smyrna rain falls in winter as on the shores of the Mediterranean Sea (p. 49), and at Omsk one finds slight traces of the summer rains which tend to occur on the polar edge of the arid and desert regions; this is similar to the rainfall at Okhotsk.

Vegetation regions.—The vegetation regions of Asia are the converse from north to south of those of Australia, with the addition in the extreme north of the frozen desert.

From the edge of the tundra one passes southwards through the temperate forests of Siberia to the steppes and grass-lands of Central Asia, and then to the hot sandy deserts, where explorers are finding in deserted villages traces of human habitations over which the sand has encroached. In this desert region are many small basins of internal drainage, as that of the Sea of Aral, similar to that of Lake Chad in the Sudan.

CLIMATES IN WESTERN ASIA.

	MONTHS.												YEAR.
	1	2	3	4	5	6	7	8	9	10	11	12	
BAGDAD.													
T.	49	51	60	69	80	89	93	93	86	77	62	53	75
P.	15	10	2	10	7	15	30	20	-7	—	7	7	-4
R.	1	2	2	1	—	—	—	—	—	—	1	2	9
DAMASCUS.													
T.	55	55	58	65	73	80	80	80	78	73	65	58	68
P.	8	8	—	8	5	10	20	18	5	—	5	5	-3
R.	2	2	2	1	—	—	—	—	—	1	2	4	14
SMYRNA.													
T.	50	50	51	58	64	72	80	78	73	65	65	52	63
P.	10	7	-3	-10	-6	-7	-11	-12	-3	5	5	9	-1
R.	4	3	3	2	1	—	—	—	1	2	4	5	25
KHIVA.													
T.	30	30	45	62	73	80	84	83	70	60	50	40	58
P.	27	20	8	-3	-10	-22	-30	-22	—	20	30	23	+3
R.	1	1	1	1	—	—	—	—	—	—	—	—	4
OMSK.													
T.	0	2	15	35	55	65	70	70	53	38	20	8	30
P.	25	20	10	5	-7	-20	-28	-21	-5	10	18	22	+2
R.	—	—	—	—	1	2	2	2	1	1	—	—	9

Further south one reaches the region of summer rains—in this case the marked summer rains of the monsoon countries—and near the equator in Ceylon, Malaysia, and the East Indies the area of the tropical forest is attained.

North of India, beyond the Himalaya, lies **Tibet**, which has been one of the last places explored by travellers, and from their reports it appears that the land there consists of long valleys lying east and west between high mountain ranges, all above an elevation of 10,000 feet. The water-parting, which separates the rivers that flow into the Indian Ocean from those which form basins of internal drainage, lies along a range called the **Trans-Himalaya**, roughly as gigantic as the Himalaya and parallel to these mountains north of the Brahmaputra. In this region is to be found a continuation of

the stony desert conditions, with grass-land conditions in the neighbourhood of the rivers. Here the **Indus**, the **Sutlej**, and the **Brahmaputra** rise, and their upper valleys north of the Himalaya support a scanty population of Tibetans, the majority of whom are nomads, who keep flocks of sheep and yaks.

In respect of elevation and vegetation this area bears some similarity to the elevated regions near the hot deserts of South Africa.

Agriculture and animals.—In comparison with the other continents (p. 40) Asia produces a small quantity of wheat and very little of the other cereals; her total produce is smaller than that of Europe or North America.

Three quarters of the wheat is grown in India, and most of the barley is grown in Japan. The rest of the cereal production is almost confined to Asiatic Russia (p. 69).

Asia has fewer horses than Europe or North America; fewer sheep than Europe or Australia; and nearly as many cattle as Europe (p. 45).

Most of the horses are in Asiatic Russia, most of the sheep are in Asiatic Turkey and India, and four-fifths of the cattle are in India (pp. 70-1).

Japan has fewer animals, a smaller growth of wheat, but a larger crop of oats than the United Kingdom (p. 69).

India and Java produce nearly half the world's crop of cane sugar (p. 55), while Asia has practically all the rice fields of the world, India, China and Japan being in order the chief producers (p. 58).

India and China together produce about one-seventh of the world's crop of cotton (p. 56).

SUMMARY.

1. Asia has very high temperatures in the south and very low temperatures in the north.

2. Asia has an exceptional change in pressure from very low in summer—centre in north-west India—to very high in winter—centre in Asiatic Russia.

3. Asia has summer monsoon rains in the south and winter rains on the west.

4. Asia has a complete range of vegetation regions from tundra in the north to tropical forests in the extreme south-east.

5. Asia comes after Europe and North America in grass-land products, both cereal and animal.

6. India is important for wheat, cattle, sheep, cane sugar, rice and cotton.

7. Japan is important for barley and rice.

8. Asia produces practically all the world's rice.

• QUESTIONS.

1. Describe the mountain systems of Asia (excluding India), and give the names and directions of the chief rivers flowing from each range with the seas into which they flow. Instead of a description, an outline map may be drawn. (Newf.)

2. Discuss the vegetation zones of Asia: on what grounds would you say that Asia could not compete successfully with Australia and South America as a source of supplies of food-stuffs to Europe in the future?

3. Describe and account for the climate of India. (L. U.)

4. What is meant by inland drainage? Locate two areas of inland drainage in Asia, and describe one of them in detail. Illustrate your answer by a sketch-map. (U. Mad.)

5. What particulars must be known before we can find out the climate of any place in India? Illustrate your answer by reference to any one of the principal towns in India. (U. All.)

6. Explain and account for the seasonal distribution of rainfall in (a) the Bombay district, (b) the Madras district, (c) Panjab. (N. U.)

37. India.

1. Record the area and dimensions of India from map measurements.

2. Record the percentage of India which is included in the plateau of the Deccan.

3. Record the distances from Bombay to Aden and Durban respectively; and from Colombo to Madras, to Calcutta and to Rangoon.

4. Summarise the facts on the climate of India given in Chapter 13.

Position.—India lies to the south of Asia, almost exactly half-way between Australia and the British Isles. Immediately to the south across the equator lies the deep ocean which stretches from Africa to Australia.

Size.—India, without Burma, is roughly half the size of Australia; Burma is almost as large as New South Wales.

The people average in density 185 to the square mile, and the total population is approximately six times that of the British

1845. The valley of the Ganges has a density of population of about 400 to the square mile, and in this respect the population is as dense as that of the valley of the Lower Nile. The whole country is about as densely peopled as Western Europe.

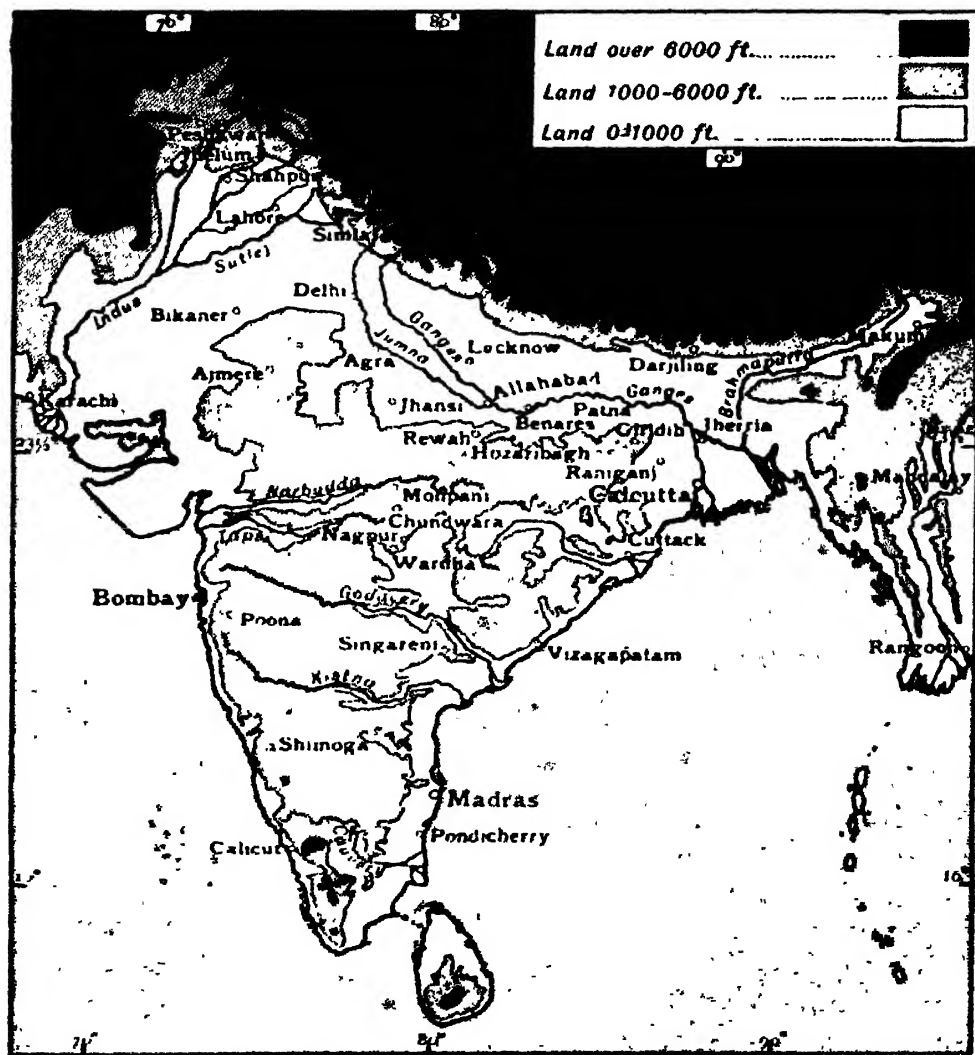


FIG. 54.—INDIA: RELIEF.

Relief.—In the north of India occur the southern slopes of the great mass of land, above a mile high, which is called in parts the **Himalaya**, the **Karakorum** and the **Trans-Himalaya** (Fig. 54).

The slopes on the southern edge drop suddenly to the lowland

between sea-level and an altitude of 1000 feet, which comprises the valleys of the Ganges and the Indus ; this lowland is known as the **Indo-Gangetic Plain**.

Further south rises the plateau of the **Deccan**, which is more than 1000 feet above the level of the sea, and rises highest towards the west coast of the peninsula. This tableland slopes steeply down

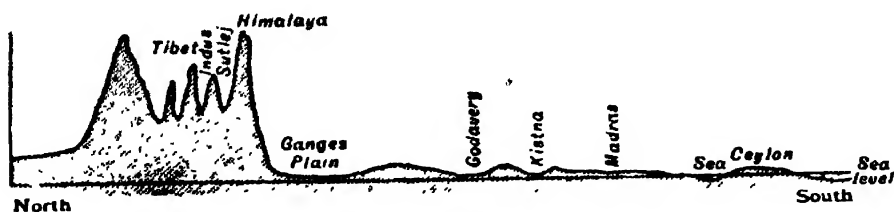


FIG. 55.—INDIA FROM NORTH TO SOUTH.

to the narrow coastal sill of lowland towards the **Arabian Sea**, and slopes less steeply towards the east, with the marked valleys of the **Godavary** and **Kistna** and a wider coastal sill of lowland towards the **Bay of Bengal**.

Fig. 55 shows the arrangement of the slopes from the north to the south of India and Fig. 56 shows the arrangement of the gradient from east to west.



FIG. 56.—THE DECCAN FROM WEST TO EAST.

The great rivers of **China** and of **Mesopotamia** make somewhat similar patches of lowland wedged in between mountain and upland with narrow openings to the sea (Fig. 53).

Climate.—The characteristics of the monsoon climate of India have been considered in Chapter 13, where the main feature is shown to be the winds and consequent rainfall, both of which are due to the pressure changes in Central Asia.

The details of the rainfall are shown in the table below ; except on the south-eastern coast lands the maximum rainfall occurs during the summer, but in the neighbourhood of **Madras** and **Pondicherry** the maximum rains are in the autumn (table, p. 178).

SEASONAL RAINFALL IN INDIA (PERCENTAGES).

District.	Winter.	Spring.	Summer.	Autumn.
Calicut - -	1	12	70	17
Poona - -	—	6	60	34
Bombay - -	—	1	80	19
Jhansi - -	1	—	80	19
Lahore - -	12	12	64	12
Peshawar - -	24	36	32	8
Darjiling - -	2	12	67	19
Calcutta - -	2	14	60	24
Cuttack - -	1	10	60	29
Madras - -	12	6	22	60
Pondicherry - -	26	7	20	47

In March, the rains begin in the neighbourhood of **Calicut** and gradually extend northwards along the western coast lands, until in the three summer months there are heavy rains over the whole country, except the south-eastern extremity and the district to the west of the Indus valley. In December, the rainy area is along the east coast from Madras southwards.

In India the seasons are not named as in Europe (Spring, Summer, etc.), but are three in number, namely, the **rainy** season in the hottest months; the **cold** (or cool) season, and the **hot**, which are both dry.

Vegetation.—Owing to its situation within the tropics and the elevation of the mountains, India contains areas which are typical of all the great vegetation regions.

On the coastal lowlands are to be found areas of tropical forests containing evergreen trees. In the north-west corner is the desert of **Thar**; and roughly in a circle round this are areas of grass-land similar to those of **Rhodesia**. The Indo-Gangetic plain is cultivated grass-land, which is, on the whole, treeless (Fig. 57).

The **Deccan** is similar to South Africa; on the upland are grass-lands and the river valleys are forested; the trees are deciduous, the chief tree being **teak**.

The mountain mass on the northern border is densely forested on the lower slopes, and as the land rises the trees gradually change from **deciduous** trees to **coniferous** trees. Higher still are to be found stunted specimens of trees similar to those on the edge of the

tundra. At a greater elevation occurs typical tundra country, and beyond this lies the area of perpetual snow, from which glaciers move slowly down to lower levels.

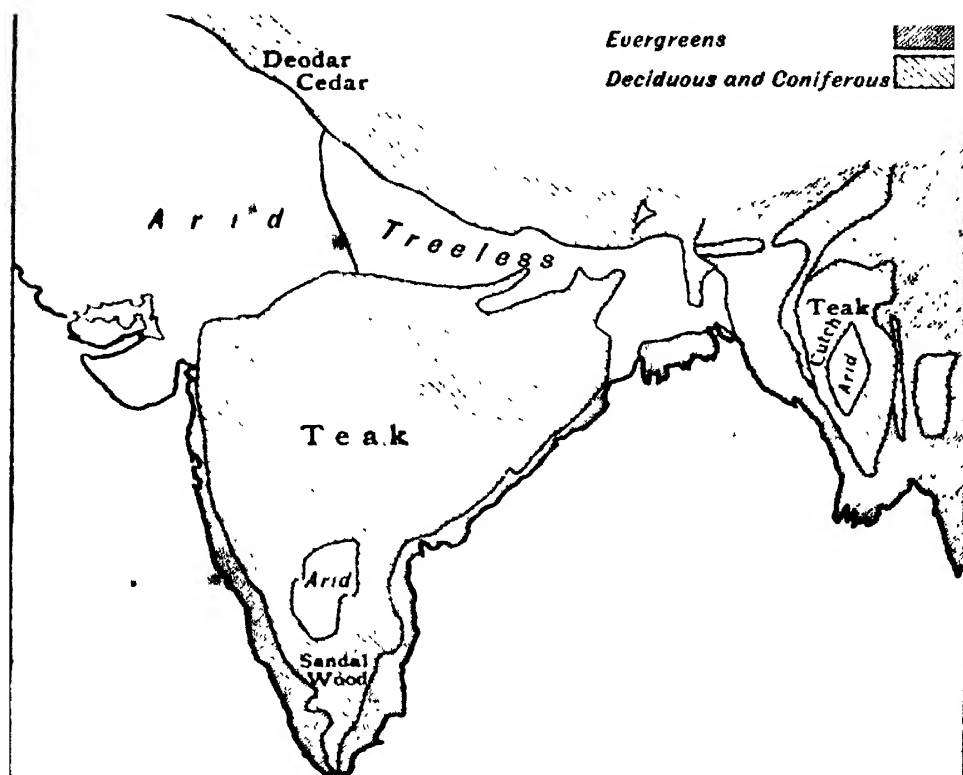


FIG. 57.—INDIA: VEGETATION.

Fig. 57 shows the distribution of trees in India, and the table, p. 180, shows that **Upper Burma** and the **United Provinces** contain the largest proportions of forest in the north, and that the proportions of forest in the British Deccan provinces is even greater than in either of these. The low percentage of forest in the native state of **Mysore** marks the arid area shown in Fig. 57.

The areas of cultivation noted in the table, p. 180, are especially marked in the cases of **Bengal**, the **United Provinces** and the **Panjab** on the lowland, and in **Bombay** and **Madras** on the coastal sills.

Crops.—The table (p. 181) shows the production of the chief crops of India.

Three-quarters of the **rice** is grown in **Bengal** and **Eastern**

Bengal and Assam ; more than half the **wheat** crop is obtained in the United Provinces and the Panjab.

CULTIVATION : ANIMALS.

	Area in million acres.	Percentages of Area.		Total Area Irrigated in million acres.	Sheep.	Cattle and Buffaloes.	Goats.
		Forest.	Culti- vated.				
in millions.							
Upper Burma -	53	17	8	0·7	—	2·6	—
Lower Burma -	55	12	14	—	—	2·3	—
Assam -	22	11	23	—	—	3·8	0·4
Eastern Bengal -	26	3	60	—	—	2·8	0·2
Bengal -	74	7	48	0·9	0·5	13·5	2·1
United Provinces -	67	14	52	10·5	2·7	32·1	8·7
Panjab -	58	6	41	10·0	4·1	13·1	5·5
North-West Frontier -	9	4	26	0·7	0·4	0·9	0·4
Sind -	30	2	12	3·2	0·3	1·7	0·9
Bombay -	45	17	52	0·7	1·6	6·2	2·1
Central Provinces -	50	23	33	0·5	0·3	8·7	1·1
Berar -	11	20	65	—	0·2	1·6	0·5
Madras -	71	18	40	7·6	7·9	16·5	5·0
Others -	2	50	32	0·6	0·3	1·6	0·3
Total—British -	573	13	36	35·4	18·3	107·4	27·2
Mysore -	18	10	34	0·9	1·6	4·6	1·3
Gwalior -	12	6	27	0·2	0·2	2·3	0·5
Others -	20	12	31	1·4	1·4	2·3	1·3
Total—Native -	50	8	31	2·5	3·2	9·2	3·1
Grand Total -	623	12	36	37·9	21·5	116·7	30·2

One-third of the **cotton** crop is grown in Bombay, and **jute** is obtained in the two main rice-growing provinces.

Madras and Bengal produce more than two-thirds of the **indigo**, while nearly half of the raw cane sugar is produced in the United Provinces.

The crops enumerated below are those in connection with which India is important to the rest of the world ; but, for the people of India, in many parts outside the rice-growing areas the most important food crops are **millets**. **Sorghum** is, after rice, perhaps the most valuable single article of food in India ; it is of greatest value in the upland tracts between lat. 15° N. and lat. 30° N.

CROPS : PRODUCTION.

	Rice in million cwt.	Wheat in million tons.	Cotton in million cwt.	Jute in million lbs.	Indigo in thousand cwt.	Raw Sugar in million lbs.
Bengal	182	0.4	—	6.5	17	870
Eastern Bengal and Assam .	117	—	—	26.7	—	403
Madras	48	—	1	—	20	—
Berar	—	—	2	—	—	—
Lower Burma	62	—	—	—	—	—
Bombay	—	—	5	—	—	—
Panjab	—	3.1	1	—	9	470
North-West Frontier . . .	—	0.3	—	—	—	—
United Provinces	—	2.1	2	—	6	2220
Central Provinces	—	0.7	1	—	—	—
Others	—	1.0	3	—	—	403
Native States	6	0.1	1	—	—	224
Total	415	7.7	16	33.2	52	4590

It is difficult to obtain figures to show the production of the remaining crops, so that the table which follows gives the details as to the areas of land occupied by each crop.

AREA OF CROPS IN INDIA.

	Maize in million acres.	Opium	Coffee	Tea.	Tobacco.
		in thousand acres.			
Assam	—	—	—	339	6
Eastern Bengal	—	—	—	83	366
Bengal	1.8	190	—	53	159
United Provinces	2.2	414	—	8	73
Panjab	1.1	7	—	10	57
Madras	0.1	—	51	13	147
Native States	0.3	81	110	—	29
Others	0.9	6	49*	2	180
Total acreage	6.4	698	210	508	1017
Total production in millions	130 bushels.	—	28 lbs.	228 lbs.	500 lbs.

* Mainly Coorg.

Maize is grown chiefly in the wheat districts, especially on the northern edge of the plains, and on the Himalayan slopes and river valleys up to 9000 feet above sea-level ; while **opium** is largely produced in the two eastern lowland provinces of Bengal and the United Provinces.

Coffee is confined almost entirely to the southern province, Madras, and the native state of Coorg ; but **tea** is largely produced in the north-east corner, in Assam.

Tobacco is grown extensively in the lowlands of the whole country.

Irrigation.—Despite the fact that parts of India receive excessive quantities of rain in the rainy season, certain portions of the country are arid, and other portions require water during the dry season. In these areas it is necessary to make arrangements to irrigate the fields. The irrigation works consist of **canals** worked by the Government, or to a small extent by private enterprise ; and of **tanks and wells**.

The table, p. 180, gives the details with regard to the areas irrigated from the waterworks. The chief of these areas are in the Panjab, Sind, the United Provinces, all of which are in the arid region close to the Thar desert ; and in Madras.

In the United Provinces, in addition to the canal system of the Ganges-Jumna, the majority of the irrigation works are tanks and wells ; in the Panjab and Sind the irrigation works are mainly canals, and most of these are the work of the Indian Government.

In Madras just over half the areas irrigated owe their water supply to tanks or wells, and the remainder obtain their supplies from Government canals.

In Sind, practically the whole of the cultivated land is irrigated ; in Madras, the Panjab, and the United Provinces only about one-quarter of the cultivated land is irrigated. These facts can be worked out from the table, p. 180.

Animals.—India contains many domestic animals, and the numbers are shown in the table (pp. 70-1).

Nearly half the **sheep** are in Madras, one-fifth are in the Panjab.

Cattle, buffaloes and goats are numerous in the United Provinces, Bengal, the Panjab and Madras, while there are proportionately many cattle in the Central Provinces.

SUMMARY.

1. India is about half the size of Australia.
2. India has definite areas of mountain, upland and lowland—Himalayas, Deccan and Indo-Gangetic plain respectively.
3. The climate of India is dependent upon the intensity and location of a low pressure area which occurs in the summer in north-west India.
4. The Thar is desert; where the Indo-Gangetic plain is cultivated, it is treeless; the coastal lowlands have tropical forests with jungle.
5. Much of India is cultivated land, which is watered from irrigation canals and wells in the arid regions.
6. The chief crops are rice, wheat, cotton, jute, indigo, raw cane sugar, millets, maize, opium, coffee, tea and tobacco.
7. Sheep, horned cattle and goats are reared, especially in Madras, Bengal, the United Provinces and the Panjab.

QUESTIONS.

1. Make rainfall graphs from the numbers in the subjoined table by the method shown in Fig. 27, p. 75. Which are, in each case, the months when the rainfall is greatest? Which are the months, in each case, when the rainfall is above the average for the year?

RAINFALL IN INDIA.

Month.	Calicut.	Poona.	Jhansi.	Darjiling.	Cuttack.	Pondicherry.
1	—	—	0.5	1	—	1
2	—	—	—	1	0.5	0.5
3	1	—	—	2	1	0.5
4	4	0.5	—	4	1	1
5	9	1	—	8	4	2
6	36	5	5	24	11	2
7	29	7	13	32	12	3
8	15	4	11	26	12	5
9	7	4	6	18	10	4
10	9	4	1	5	6	8
11	4	1	—	—	1	12
12	1	—	—	—	—	12
Year.	115	26.5	36.5	128	58.5	51

2. Describe the climate of India. Which parts are covered with woods and which are desert? Give the chief productions. Give, in order, the names of the chief rivers, stating where they rise. (Newf.)

3. What do you understand by the relief of a country? Into what regions may India be divided in point of relief? (U. All.)

4. Account for the variety in the distribution of rainfall in India. Give a full account of the monsoons. (U. All.)

5. Write out a list of the principal products of India, excluding food-stuffs, and name the place where each is chiefly grown. (U. All.)

6. Compare the monsoon rainfall of Bombay with that of Madras, showing the difference, if any, in season, amount, and direction of the monsoon current. (U. Pan.)

7. Where are the wettest and the driest parts of India? Account for the excessive rainfall or drought in each case. (U. Pan.)

8. Draw a sketch-map showing the coasts of India, the rivers Ganges, Indus, Tapti, and Kistna. Show by a line the margin of the mountainous land that borders India on the north-west, north, and north-east, and shade this mountainous part. Write 'wheat,' 'cotton,' and 'jute' across the regions where they are chiefly cultivated. Insert Calcutta, Delhi, Karachi and Peshawar. (L. U.)

38. India : Mines, Manufactures, Commerce.

COAL PRODUCTION IN INDIA.

Province.	Thousand Tons.	Chief Coalfields.
Assam - - -	280	Makum
Bengal - - -	8893	Raniganj, Jherria, Giridih
Rajputana - -	34	Bikaner
Central India -	169	Rewah
Panjab - - -	60	Jhelum, Shahpur
Central Provinces	145	Mohpani, Wardha Valley, Chundwana
Nizam's Territory	440	Singareni
Rest - - -	44	
Total - - -	10065	

1. On an outline map of India mark in the coal-mining districts from the above table.

Mark, by means of arrow heads upon the same map, the movements of coal to other provinces, from the table, p. 187.

Mark similarly the directions of the exports of coal from Bengal towards neighbouring countries, from the table, p. 187.

2. From the tables, p. 191, and the map, Fig. 58, make a complete list

of the areas served by Calcutta, Bombay, Madras and Karachi. On an outline map of India show these areas by four different colours, or kinds of shading.

In some cases areas are served by two ports : can you account for this ?

3. From the tables, pp. 186, 192, 195 make a complete list of the articles in which there is trade between India and the United Kingdom. Add for each article the percentage of the total trade in that article which goes to, or comes from, the United Kingdom.

Mining in India.—There is a gradually increasing number of miners in India ; but the output obtained from the mines by these workers does not increase faster than the number of miners. “Apparently the Indian miner has not yet reached that stage of ambition when he wishes to increase his earnings. As by filling one tub per day he can obtain quite sufficient to meet all his needs, it does not dawn upon him that by filling three he might be steadily placing himself beyond the risk of want.” The Indian miner regulates his labour by the eating and drinking capacity of himself and his family. “Some day he may become better educated and aspire to better things, even to the point of placing a higher value upon his labour. . . . Some mine managers have discovered the hidden possibilities of the miner, and, under their guidance, he has learned to work better and to show that he can appreciate the difference between a squalid hut and a clean and comfortable dwelling.” *

At present 105,000 people are employed in the mines, which is roughly 1 person in 3000 of the population.

Coal is mined chiefly in Bengal, at **Raniganj** and **Jherria**.

Coal is the chief mineral obtained in India, but the country is also a very important producer of **manganese** and **mica**.

PRODUCTION OF MANGANESE IN 1000 TONS.

		Indian Province.		Mines.
Russia -	627	Central Provinces	317	Nagpur, Balaghat
Brazil -	191	Madras - -	103	Vizigapatam
		Mysore - -	46	Shimoga
		Rest - - -	43	
		Total (India) -	509	

* Report of the Chief Inspector of Mines in India.

India produces the second largest quantity of manganese-ore, much of which is mined near Nagpur and Vizigapatam.

PRODUCTION OF MICA.

	Value in £1000.	Indian Province.	Quantity in 1000 cwt.	Mines.
India	174	Bengal	24	Hazanbagh, Gaya, Monghyr
Canada	57			
U.S.A.	50	Madras	13	Nellore
		Rajputana	5	Ajmere, Merwara
		Total (India)	42	

India is the world's largest producer of mica, which is mined chiefly in Bengal.

Indian trade in coal.—India, like Australia and Canada, produces about 1 per cent. of the world's coal, and about twice as much as British South Africa. But while Australia exports about half, and British South Africa about a quarter of the quantities mined, India sends overseas only about one-twelfth of her product. On the other hand, since the large population of India renders her a larger consumer of coal, the only part of India which mines more than is required for local needs is Bengal. It thus happens that India imports some coal from over-sea countries, chiefly the United Kingdom, as shown in the table below.

IMPORTS OF FOREIGN COAL INTO INDIA.

(80 % to Bombay.)

From	Thousand Tons.	From	Thousand Tons.
United Kingdom	194	Japan	19
Australia	47	Others	6
British South Africa	31	Total	297

In addition, there is considerable internal traffic in coal by railway and by river from Bengal to all other parts of the country, but chiefly to Calcutta, the United Provinces, and the Panjab. The details of this traffic are shown in the next table, and illustrate the internal traffic which must occur when one area in a large country produces a commodity which other areas need. From the

port of Calcutta, coal is sent by sea to Bombay, Karachi, Madras and Rangoon.

TRADE IN COAL.

(a) By Rail and River from Bengal.

	Thousand Tons.		Thousand Tons.
To		To	
Calcutta - - -	5575	Rajputana and Central India	156
Bombay Province - -	215	Eastern Bengal and Assam	144
United Provinces - -	602	Madras Province - -	22
Panjab - - -	346	Others - - -	2
Central Provinces - -	164	Total - - -	7226

(b) By Sea from Calcutta.

	Thousand Tons.		Thousand Tons.
To		To	
Bombay - - -	1004	Rangoon - - -	346
Karachi - - -	395	Others - - -	188
Madras - - -	203	Total - - -	2136

Indian coal is sent to the neighbouring lands across the Indian Ocean, and some of it reaches Hong Kong. The annexed table shows the destinations of this coal, and a comparison with the tables of exports of Australian and South African coal shows that Indian coal competes with Australian coal at Singapore, and with South African coal at Singapore, Mauritius, Ceylon, and with both Australian and South African coal in Bombay.

EXPORTS OF INDIAN COAL FROM INDIA.

	Thousand Tons.		Thousand Tons.
To		To	
Aden - - -	24	Java - - -	8
Mauritius - - -	10	Straits Settlements - -	204
British East Africa - -	7	Sumatra - - -	50
Ceylon - - -	360	Hong Kong - - -	45
Others - - -	9	Total - - -	717

Manufactures.—India is almost entirely an agricultural country ; in addition to the small amount of ~~mining~~ already noted there are in the United Provinces and the Panjab surplus productions of

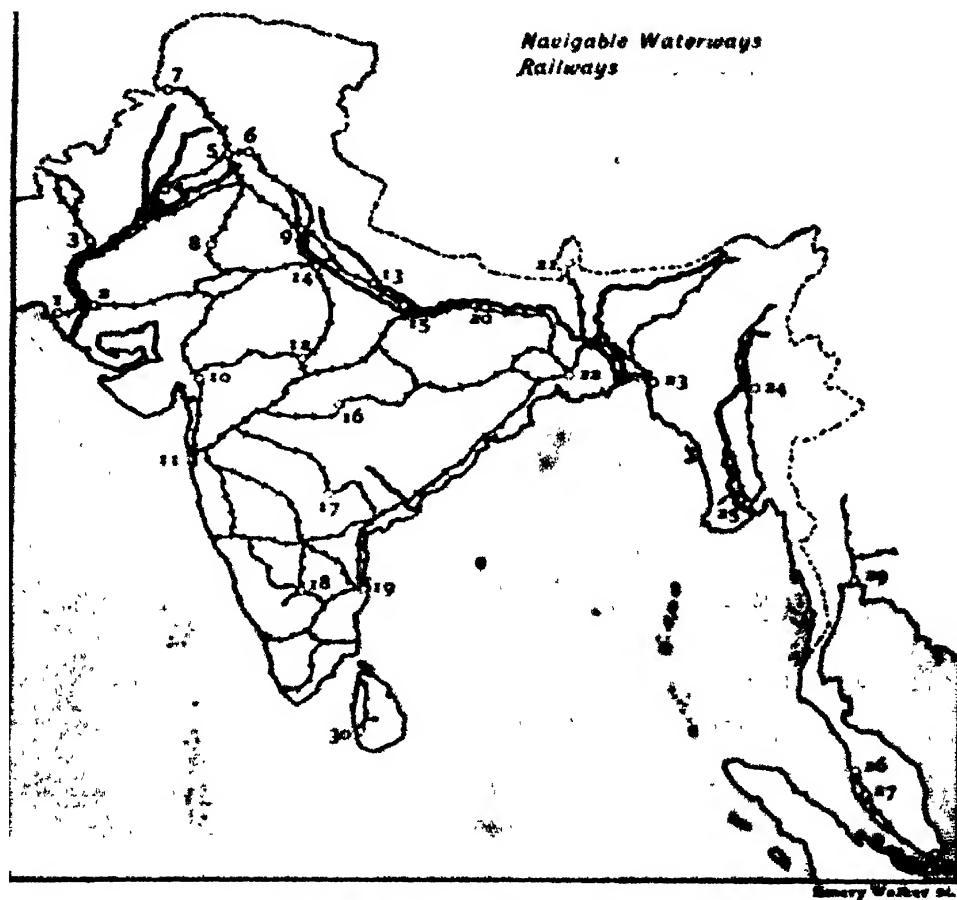


FIG. 52.—INDIA: COMMUNICATIONS.

- | | | | |
|---------------|----------------|----------------|-------------------|
| 1. Karachi. | 9. Delhi. | 16. Nagpur. | 29. Chittagong. |
| 2. Hyderabad. | 10. Baroda. | 17. Hyderabad. | 30. Mandalay. |
| 3. Shikarpur. | 11. Bombay. | 18. Bangalore. | 31. Rangoon. |
| 4. Multan. | 12. Bhopal. | 19. Madras. | 32. Tarapong. |
| 5. Lahore. | 13. Cawnpore. | 20. Patna. | 33. Kwaia Lampur. |
| 6. Amritsar. | 14. Agra. | 21. Darjiling. | 34. Singapore. |
| 7. Peshawar. | 15. Allahabad. | 22. Calcutta. | 35. Bangkok. |
| 8. Bikaner. | | | |

apparel, and in the Province of Bombay a surplus production of cotton goods. It is thus clear that the people of India are almost entirely occupied with the primary industries, and that like the

people of Australia they produce a small quantity of the manufactured articles which they need, but they have to import the major portion of their clothing and machinery.

Internal communications.—A populous country such as India must be provided with numerous ways of communication in addition to the routes round the coast by sea. The map, Fig. 58, shows the possibilities of river navigation on the Indus and its tributaries from the sea near Karachi to the foot of the mountains, on the Ganges* and Brahmaputra and the Ganges tributaries to the mountain foot, and on the Godaveri and Irrawadi many miles upstream.

The railways of India are also shown, and these differ in direction from the railways of either Australia, or South Africa, in both of which countries the tendency is to make one long trunk line of railway with many side branches to important centres of traffic. In India, the tendency is to provide railway lines across country from east to west, and to connect these cross lines with as many links as possible. From Delhi, for example, it is possible to travel by two routes to Karachi, by two routes to Calcutta, by two routes to Bombay, and thence to Madras.

The railways are about 30,000 miles in length, and there are about 60,000 miles of metalled roads in the country.

Internal traffic.—The necessity for easy means of internal communication is shown by the map, Fig. 59.

Each of the Provinces trades with its immediate neighbour across the common boundary, and most of them trade with other Provinces across one or more of those Provinces which intervene. The directions of this trade are shown by arrows on the map, Fig. 60, while the principal articles are named.

There is much concentration of traffic from all parts of Northern India on the great ports Calcutta and Bombay. The Panjab, for example, sends apparel, raw cotton, and wheat to the Provinces of Bombay and Bengal, and to the ports Calcutta, Bombay and Karachi.

The traffic in coal from Bengal has been shown on p. 187, and this table serves to illustrate the meaning of the arrows on the map, Fig. 59.

The accumulation of traffic at the great port of Calcutta is shown in the table below, from which it appears that this port accumulates the goods named from Eastern Bengal, Bengal, the United Provinces, the Panjab, Bombay province and port. It

also sends goods to the same areas, with the exception of Bombay.

This area served by Calcutta is sometimes called the **hinderland** of Calcutta.

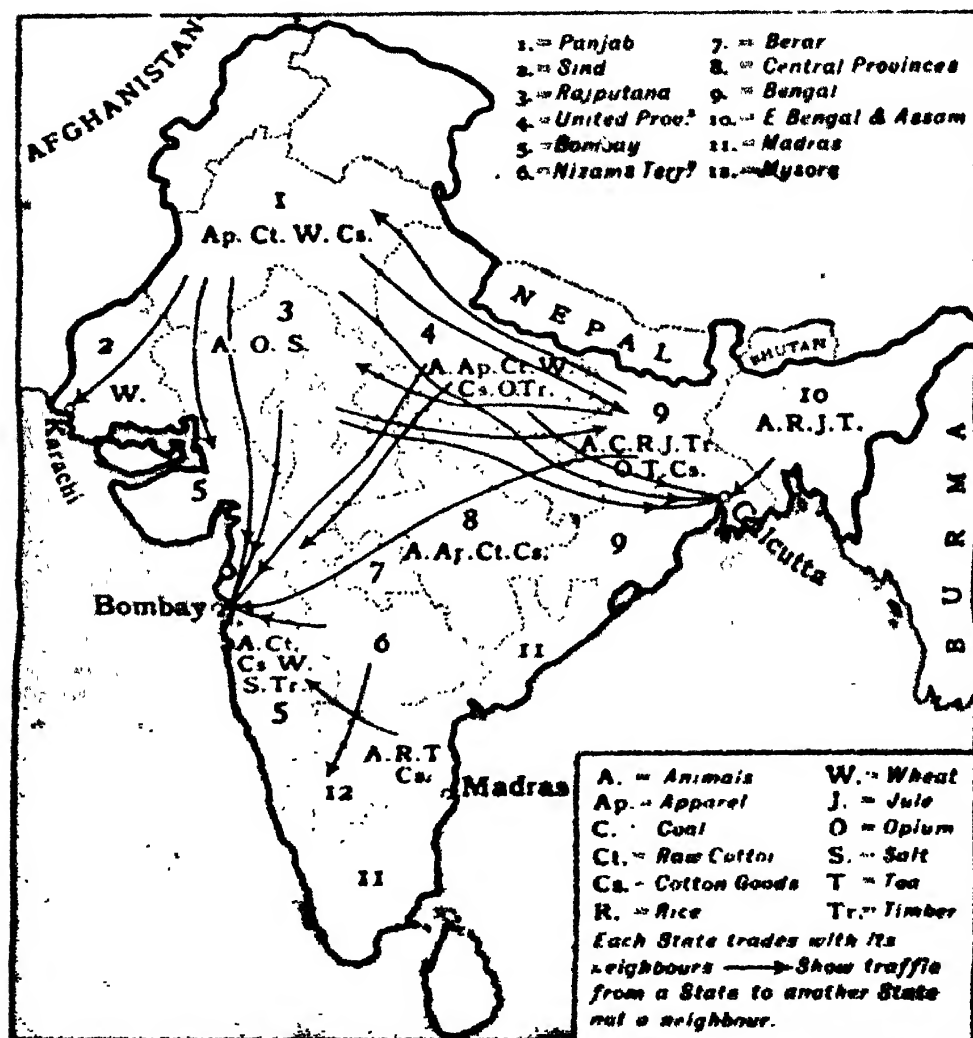


FIG. 50.—INDIA: INTERNAL TRADE.

The hinterlands of the other great ports are named in the table, p. 191; from which it appears that the hinterlands of Calcutta and Karachi overlap in the Panjab, those of Calcutta and Bombay overlap in the Panjab, the United Provinces and Rajputana; while the hinterland of Madras is self-contained.

RAIL AND RIVER BORNE TRAFFIC OF CALCUTTA.

Article.	To the port from :	From the port to :
Cattle - - -	B. (11), U.P. (4)	
Sheep and goats - - -	B. (51)	
Apparel - - -	U.P. (4)	E. B. A. (10), B. (6), U.P. (3), P. (5)
Coal - - -	B. (83)	
Cotton - - -	U.P. (2)	
Cotton goods - - -	B. (2), B. Prov. (2), B. Port (2)	E. B. A. (10), B. (15), U.P. (7)
Rice - - -	B. (14), E. B. A. (7)	E. B. A. (3), B. (26), U.P. (10)
Wheat - - -	P. (7), U.P. (14)	
Flour - - -		E. B. A. (10), B. (22)
Jute - - -	E. B. A. (53)	B. (4).
Iron and steel - - -	B. (6)	E. B. A. (14), P. (1), B. (15), U.P. (6)
Sugar - - -	B. (3)	E. B. A. (8), B. (11), U.P. (9)
Tea - - -	B. (7), E. B. A. (60)	

(Figures) are percentages of the total rail and river borne traffic of India in each article. *

B. = Bengal; U.P. = United Provinces; B. Prov. = Bombay Province; B. Port = Bombay Port; P. = Panjab; E. B. A. = Eastern Bengal and Assam.

HINDERLANDS OF OTHER PORTS.

Karachi.—Panjab, Sind.

Bombay. — United Provinces, Panjab, Central Provinces, Bombay, Rajputana, Nizam's Territory.

Madras. — Madras, Mysore.

Land trade.—Closely connected with the internal trade by rail and river is the trade which India carries on with the neighbouring foreign countries by land.

The table below gives the total values of this land trade which is about 4 per cent. of the total foreign trade of India. Bengal carries on a large share of this trade with **Nepal**. Burma is largely interested in the trade with the Shan States, and the United Provinces and the North-West Frontier Province trade largely with **Afghanistan**.

The land route into the latter country, is by the famous **Khyber Pass** shown in Fig. 60.

LAND TRADE OF INDIA.

To	Total in £1000s.	From	Shares of this trade.	Per cent.
Nepal	2943	Sind		9
Afghanistan	1216	North-West Frontier Province		18
Siam	312	Panjab		1
Others	3286	United Provinces		14
Treasure	1105	Bengal		25
		Burma		33
Total	8862	Total		100

INDIAN IMPORTS.

Article.	Total.	Country of Origin.*	Provincial Shares.*
Wheat 10 ³ cwt.	256	Australia (60), Asiatic Turkey (139)	Bombay (75)
Wheat flour do.	49	Hong Kong (34)	Burma (63)
Rice . . do.	75	Straits Settlements (61)	Bombay (71)
Coffee . . do.	8	Straits Settlements (3)	Bombay (54), Burma (46)
Sugar . . do.	10,045	Java (6512), Mauritius (2600)	Bengal (40), Bombay (33)
Tea . . do.	35	Ceylon (13), China (13)	Bengal (75)
Butter . 10 ³ lbs.	234	Denmark (108), United Kingdom (69)	Burma (78)
Cheese . . do.	1362	United Kingdom (706), Holland (546)	Bengal (30), Bombay (31)
Tobacco . do.	630	United Kingdom 280, United States 210	Bengal (40), Burma (21)
Wool . . do.	2968	Persia (1829), Australia (576)	Bombay (63)
Cotton 10 ³ yds. goods	2530	United Kingdom (2490)	Bengal (52), Bombay (26)
Silk goods £10 ³	1423	Japan (598), France (226)	Bombay (66)
Woollen . do. goods	1845	United Kingdom (1139), Germany (548)	Bombay (43), Bengal (25)
Iron and . do. Steel goods	13,400	United Kingdom (10,100)	Bombay (45), Bengal (30)
Timber . . do.	546	Siam (363)	Bombay (57)

* The figures attached to the Country are quantities; those attached to the Province are percentages.

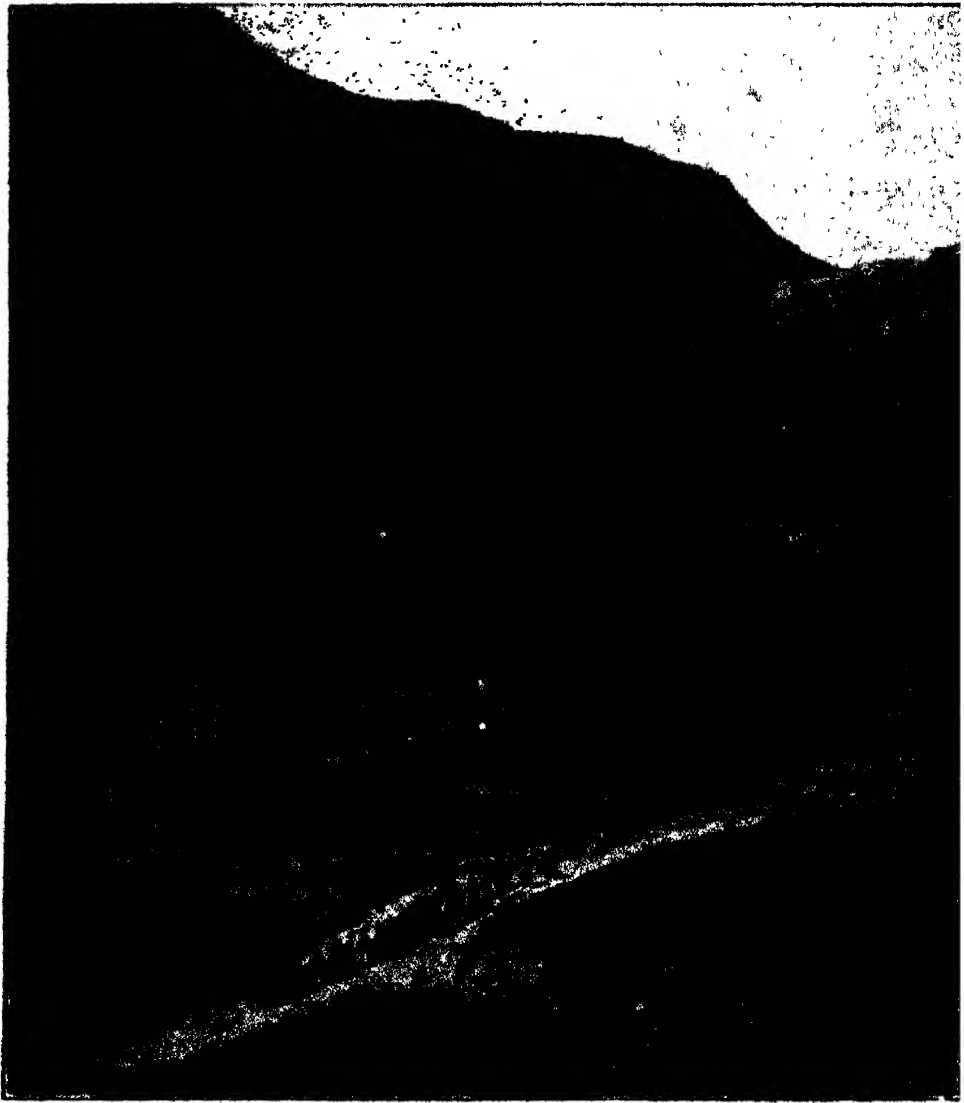


FIG. 60.—THE KHYBER PASS.

Imports into India.—The principal articles which are imported into India are shown in the above table, which states also the coast province which takes the major portion of this article.

The articles can be divided into two definite groups: those which are sent from the nearer countries oversea, which almost entirely go to Bombay, and those from the great manufacturing

countries usually in Western Europe, which go chiefly to Bengal and Bombay.

With the single exception of sugar, goods of the first group—wheat, flour, rice, coffee, tea, wool—are produced in and exported from India in larger quantities than they are imported (table below). Consequently these imports are to be taken in connection with the internal trade of India; for example, Bombay imports wheat from Australia and Turkey in Asia by sea to supplement the supplies received by land from the Panjab and the United Provinces.

Similarly, sugar is sent from Madras to the United Kingdom by sea, and is received by sea from Java and Mauritius in the other coast provinces.

Goods of the second group are iron and steel goods and textile fabrics. With the single exception of silk goods, these are supplied almost entirely by the United Kingdom to Bombay and Bengal.

Exports of Indian Produce.—The goods named in the table (p. 195) consist of the first eleven in which there is a small import trade, and the remaining seven which India does not import but exports in large quantities.

With the exception of wheat, flour, butter, tobacco and opium, a large proportion of the quantities of all the exports are sent to the United Kingdom mainly from Bengal and Bombay. The most important exception to this statement occurs in connection with raw cotton, which is sent from Bombay to Japan, Germany, Belgium and Italy.

INDIAN TRADE IN MILLION POUNDS STERLING.

	Import.	Export.		Import.	Export.
With			With		
United Kingdom -	58	30	Germany - -	5	14
Ceylon - - -	1	4	United States - -	2	9
Straits Settlements -	2	5	Belgium - - -	1	6
Hong Kong - - -	1	6	France - - -	1	7
Australia - - -	—	2	Japan - - -	2	6
Rest of Empire -	2	2	China - - -	1	4
			Other Foreign -	11	20
Total—{British Empire}	64	49	Total—Foreign	23	66
			Grand Total	87	115

EXPORTS OF INDIAN PRODUCE.

Article.	Total.	Destination.*	Provincial Shares.*
Wheat 10 ³ cwt.	17,609	U.K. (15,425)	Sind (96)
Wheat flour do.	744	Aden (202), Ceylon (116)	Bombay (76)
Rice - do.	38,249	U.K. (3021), Holland (3713), Japan (2498), Austria-Hungary (3399), Straits Settlements (4484), Java (1287), Egypt (1181)	Burma (77)
Coffee - do.	244	U.K. (123), France (76)	Madras (99)
Sugar - do.	219	United Kingdom (164)	
Tea - do.	2026	United Kingdom (1509), Australia (90), Russia (170)	Madras (93) Bengal (92)
Butter - 10 ³ lbs.	345	Ceylon (153), Aden (61), Straits Settlements (57)	Bombay (99)
Tobacco 10 ⁶ lbs.	21	Aden (7), Straits Settlements (6), Hong Kong (3)	Bengal (33), Madras (37)
Wool - do.	40	United Kingdom (38)	Sind (50), Bombay, (38)
Cotton 10 ⁶ yds. goods	74	Aden (12), Ceylon (8), Straits Settlements (11)	Bombay (70)
Timber 10 ³ tons (teak)	40	United Kingdom (27)	Burma (97)
Opium 10 ³ cwt.	90	China (17), Hong Kong (50), Straits Settlements (19)	Bengal (77), Bombay (22)
Cotton - do.	8562	Japan (2245), Germany (1927), Belgium (1198), Italy (1065), U.K. (439)	Bombay (69)
Hemp - do.	658	United Kingdom (301), Belgium (147)	Bombay (51), Bengal (36)
Jute - do.	14,000	United Kingdom (5000), Germany (3000)	Bengal (99)
Silk - do.	17	France (11), U.K. (4)	Bengal (64)
Indigo - cwt.	32	U.K. (9), Egypt (6)	Bengal (51), Madras (33)
Jute goods £10 ⁶	12	United States (4), U.K. (1)	Bengal (99)

* The figures attached to the Country are quantities ; those attached to the Province are percentages.

PERCENTAGE SHARE.

	Bengal.	Bombay.	Sind.	Madras.	Burma.
Import	40	36	8	8	8
Export	42	26	10	12	10

Indian trade.—The importance of the trade between the United Kingdom and India, which has been noticed in connection with the principal articles of export and import, appears more definitely in the above table, where it is shown that the value of this trade amounts to over 60 per cent. of Indian imports and over 25 per cent. of Indian exports. The importance of Indian exports in the trade of Ceylon, Hong Kong and the Straits Settlements is shown by the fact that this trade accounts for over 12 per cent. of the Indian exports.

The cotton, jute, and jute goods sent by India to Germany, the United States, etc., make the exports of India to these countries much larger than the Indian supplies sent by these countries.

Finally, the importance of the great ports of Calcutta and Bombay is shown by the high percentages of the trade which are given for Bengal and Bombay respectively.

SUMMARY.

1. Mining occupies very few people in India ; the chief minerals are coal, manganese and mica.

2. Coal is supplied from India to neighbouring lands across the Indian Ocean.

3. Bengal supplies coal to the rest of India.

4. There are few manufactures in India.

5. India is excellently served by railways, roads and navigable rivers for purposes of traffic.

6. The hinterland of Calcutta is the Ganges Valley and just beyond : that of Karachi is the Indus Valley.

7. Bombay is the port for the western part of the Deccan and northwards to the Himalaya.

8. There is an extensive land trade from India to Nepal and Afghanistan.

9. India imports chiefly manufactured goods, largely from the United Kingdom.

10. India exports raw materials to the United Kingdom.

11. India sends raw cotton largely to Japan and Germany.

QUESTIONS.

1. Enumerate the commodities in which there is trade between India and countries whose shores are washed by the Indian Ocean.

2. Compare the trade which centres on Bombay with that which centres on Calcutta.

3. Draw a map of the Deccan, showing the boundaries of the provinces and the native states, the courses of the chief rivers, and the positions of the most important towns. (U. Pan.)

4. Enumerate the chief imports brought into India. From what countries are they brought, at what ports are they landed? (U. Pan.)

5. What are the chief mineral products of India? In what localities are they found, and to what extent are they worked? (U. P.)

6. The railways of the Panjab follow more or less closely the courses of the Indus and its tributaries. Explain this fact, and say to what causes railway expansion is chiefly due. (U. Pan.)

7. Draw a map of India and indicate upon it the principal centres of manufacture, and the localities where her chief mineral and vegetable products are obtained. (U. Pan.)

8. Discuss India under the following heads: (a) rainfall, (b) river systems, (c) agriculture, (d) seaports. (Alb.)

9. In the map of India insert the Ganges, Jumna, Godaveri and Indus. Mark the areas where tea, coffee, cotton, wheat and rice are grown, together with Bombay, Allahabad, Agra, Lahore, Karachi. (C.W.B.)

39. British Asia, except India.

1. Record the climatic and other facts regarding Ceylon, Singapore and Hong Kong.

2. Trace an outline map of the area shown in Fig. 61, and mark on it the rainfall regions and the typical vegetation regions.

3. On a similar map mark from Fig. 61 the coalfields and the coaling stations of Aden, Mauritius, Colombo and Singapore. Mark arrow heads from the tables below to show the directions in which there is traffic in coal.



FIG. 61.—SOUTH-EAST ASIA.

COAL IMPORTS IN 1000 TONS.

	To	Ceylon.	Singapore.	Penang.
From				
United Kingdom		283	75	—
India		379	197	49
Japan		15	197	—
Australia		—	124	—
Others		8	33	13
Total		685	626	62

Position.—On the edge of the land hemisphere, Fig. 2, lie the British possessions of Ceylon, the Straits Settlements (Singapore, Malacca, Penang), the Federated Malay States (Perak, Selangor, Negri Sembilan, Pahang) and Hong Kong (Fig. 61).

Climate.—Places within the tropics usually have a high temperature with slight variation, a low pressure with slight variation and

heavy rainfall throughout the year. The table below illustrates these facts for the places named, all of which except Hong Kong are in British tropical Asia.

THE CLIMATE OF IMPORTANT PORTS.

	MONTHS.												YEAR.
	1	2	3	4	5	6	7	8	9	10	11	12	
COLOMBO.													
T.	79	80	82	83	82	81	81	81	81	80	80	80	81
P.	-10	-10	-10	-20	-20	-20	-20	-20	-20	-20	-10	-20	-20
R.	3.5	2.1	4.5	10.5	11.4	7.8	4.5	3.5	4.8	14.5	12.0	5.4	84.5
RANGOON.													
T.	75	78	81	83	83	80	79	79	79	80	78	76	79
P.	-7	-12	-14	-17	-27	-27	-30	27	-25	-20	-13	-8	-19
R.	—	—	—	2	12	18	21	20*	16	7	3	—	99
SINGAPORE													
T.	80 ⁶	83	83	83	83	83	82	82	82	81	82	79	82
P.	-17	-17	-18	-20	-20	-17	-15	-20	-17	-13	-19	-15	-17
R.	10	5	2	2	3	8	8	8	8	16	16	16	102
VICTORIA (LABUAN).													
T.	77	82	82	83	83	83	83	83	83	82	82	78	82
P.	-13	-13	-14	-15	-15	-17	-15	-20	-17	-13	-21	-15	-16
R.	12	8	8	8	8	12	8	8	8	16	16	16	128
HONG KONG.													
T.	60	61	68	73	80	83	83	84	82	77	72	66	74
P.	+10	+10	+3	-8	-20	-27	-30	-27	-17	-3	+7	+10	-8
R.	1	2	3	6	14	19	13	14	8	5	1	1	85

Crops.—The population in these lands is largely native and generally dense, and the people cultivate the tropical crops, rice, tea, coconuts and rubber.

Tea is a special crop in Ceylon, where the area cultivated and the average crop are almost the same as those for the whole of India (p. 181).

In the Malay peninsula, coconuts and rubber with rice and paddy are the important crops.

ACREAGE CULTIVATED IN 1000 ACRES.

		Total.	Rice.*	Tea.	Coconuts.	Rubber.
Federation Malay States.	Ceylon . . .	2770	680	552	917	130
	Perak . . .	132	—	—	61	57
	Selangor . . .	112	—	—	83	82
	Negri Sembilan . . .	59	—	—	19	27
	Pahang . . .	18	—	—	16	2
	Total . . .	321	—	—	119	168
Straits Settlements.	Singapore . . .	—	—	—	30	2
	Penang . . .	—	57	—	98	3
	Malacca . . .	—	38	—	42	40
	Total . . .	—	95	—	160	45

* Includes paddy, that is, rice in the husk.

Ceylon Tea.—The tea trade of Ceylon causes that island to import lead in pigs, lead specially prepared for the lining of tea chests, and tea chests themselves from the United Kingdom, Australia and Japan.

CEYLON IMPORTS FOR THE TEA TRADE.

	Total.	Percentages from:
Lead in pigs 10 ³ cwt.	59	United Kingdom (18), New South Wales (21), South Australia (68)
Tea Lead - 10 ³ cwt.	32	* United Kingdom (99)
Tea Chests - 10 ³ .	1714	United Kingdom (27), India (2), Japan (68)

Ceylon tea is almost entirely grown (‡) for the British Empire; more than half the exports from Ceylon being sent to the United Kingdom.

CEYLON TEA EXPORTS IN 1,000,000 LBS.

To		To	
United Kingdom . . .	110	China	5
Australia	19	Russia in Europe . . .	12
Canada	7	Russia in Asia	5
New Zealand	4	Others	8
United States	5	Total	175

Coconut palms and their products.—Coconuts yield a fibre called coir, the dried kernel called copra, coconut oil, and desiccated coconut. Ceylon supplies all forms mainly to the United Kingdom, while Singapore and Penang supply copra to Russia and France.

COCONUT PRODUCE IN 1,000,000 LBS.

From	CEYLON.					SINGAPORE.	PENANG.
	Nuts.*	Desiccated Coconut.	Coir.	Coconut oil.	Copra.	Copra.	Copra.
To							
United Kingdom	11	12	13	25	—	—	—
Germany . . .	1	3	4	—	19	7	5
Belgium . . .	—	—	4	—	5	7	—
Austria-Hungary	—	—	—	7	7	—	—
India . . .	—	—	—	7	—	—	—
United States . .	—	4	—	12	—	—	—
Russia . . .	—	—	—	—	8	35	4
Italy . . .	—	—	—	—	—	6	3
France . . .	—	—	—	—	—	18	15
Others . . .	4	4	8	12	16	10	6
Total . . .	16	23	20	63	55	83	33

* Millions only, not by weight.

Other products.—Rice is an important product of Malaysia whether British or Native, and with paddy is imported into Ceylon and the Straits Settlements.

* RICE TRADE IN 1,000,000 LBS.

From	India.†	Straits Settlements.	Siam.	Native Malay States.	Others.	Total.
To						
Ceylon . . .	672	44	—	—	20	736
Singapore . .	184	9	534	34	70	831
Penang . . .	235	9	—	—	39	283
Malacca . . .	—	41	—	—	—	41

* Includes paddy.

† Includes Burma.

Rubber is sent from Ceylon and Singapore to the great manufacturing nations.

RUBBER EXPORTS IN 1,000,000 LBS.

	To	United Kingdom.	United States.	Germany.	France.	Japan.	Others.	Total.
From								
Ceylon		0.4	0.1	—	—	—	0.1	0.6
Singapore		1.3	1.8	0.5	0.7	0.3	0.4	5.0

Coffee, pepper and tapioca are tropical products which are collected from the neighbouring lands at Singapore for export to the more distant lands of the world.

SINGAPORE TRADE IN 1,000,000 LBS.

From	Malay States.		Dutch possessions.	Sarawak.	Malacca.	Penang.	Others.	Total.
	Federated	Native.						
Coffee	3	—	4	—	—	—	1	8
Pepper	—	20	10	10	—	—	4	44
Tapioca	4	—	5	—	29	10	5	53

To	United Kingdom.	France.	Germany.	Russia.	United States.	Australia.	Others.	Total.
Coffee	—	0.5	—	—	0.7	—	5.2	6.4
Pepper	5	—	6	2	12	1	18	44
Tapioca	18	6	—	—	11	8	10	53

Tin.—Tin is mined in the Federated Malay States and in the Dutch Islands, Banca and Billiton.

TIN EXPORTS IN 1,000,000 LBS.

From	Perak.	Selangor.	Negeri Sembilan.	Pahang.	Total.
Tin	16	14	6	1	37
Tin ore	59	33	6	5	103

In Malaysia, Perak and Selangor are the largest producers.

The mineral is collected at Singapore and Penang from the mines, and is then distributed to Western Europe.

TIN TRADE IN 1,000,000 LBS.

From	Federated States.	Dutch Possessions.	Australia.	Siam.	Others.	Total.
<i>Singapore.</i> Tin	17	—	—	—	2	19
Tin ore	58	6	4	—	2	70
<i>Penang.</i> Tin	21	—	—	7	—	28
Tin ore	49	—	—	5	—	54

To	United Kingdom	France.	United States.	Others.	Total.
<i>Singapore.</i> Tin	38	6	15	8	67
<i>Penang.</i> Tin	37	—	16	11	64

The Entrepôt trade of Singapore and Penang.—The details (pp. 201-3) about the trade of Singapore in coffee, pepper, and tapioca, and that of Singapore and Penang in tin, emphasise the fact that Singapore especially, and Penang to a smaller degree, are entrepôts in the world's trade: this is due to their position on the great trade routes, as shown in Fig. 26.

In addition to the articles already named there is a similar trade in sugar, rubber, rice, and copra.

ENTREPÔT TRADE IN 1,000,000 LBS.

	Malay States.		Dutch Possessions.	Siam.	Sarawak.	Malacca.	Others.	Total.
	Federated.	Native.						
To Singapore, Rubber	1	—	3	—	1	—	—	5
„ Copra	—	13	51	—	—	3	44	111
Penang, Copra	3	—	13	—	—	—	1	17
From Singapore, Rice	155	71	226	—	—	—	141	593
Penang, Rice	98	—	117	19	—	—	38	272

The details given above with those given earlier in the chapter on the trade in rubber, copra and rice, show that Singapore itself produces little yet deals in many articles.

Similar facts are illustrated in the next tables, which show the imports of Ceylon, Singapore and Penang of cotton and iron goods

mainly from the United Kingdom, and the exports from Singapore and Penang to the neighbouring lands. Some idea of the profits of entrepôt trading are indicated by the fact that Singapore exports cotton goods to twice the value of the imported goods, while there are practically no manufactures.

MANUFACTURED GOODS IN £1000.

(a) Imports.

To	CEYLON.		SINGAPORE.		PENANG.	
	Cotton.	Iron.	Cotton.	Iron.	Cotton.	Iron.
From						
United Kingdom	358	830	1460	251	370	128
India	126	—	385	—	105	—
Germany	—	70	—	71	—	—
Others	66	100	555	225	225	72
Total	550	1000	2400	547	700	200

(b) Re-exports.

To	FROM	SINGAPORE.		PENANG.
		Cotton.	Iron.	Cotton.
Siam		1730	31	69
Dutch Possessions		1490	28	129
Penang		290	—	—
Federated Malay States		390	41	84
Native Malay States		290	—	—
Others		610	40	18
Total		4800	140	300

British North Borneo, Sarawak and Labuan are parts of the British Empire to the east of Singapore, to the trade of which they contribute.

British North Borneo produces about 200 million lbs. of tobacco yearly, and this commodity forms half the value of her exports.

Sarawak exports rubber, pepper, and some gold.

Hong Kong is a port for China, and no record is available of its trade.

SUMMARY.

1. British tropical Asia includes Ceylon, the Straits Settlements, the Federated Malay States, British Borneo.
2. Ceylon produces tea.
3. The Federated Malay States produce tin.
4. All areas produce tropical articles: rice, rubber, pepper, tapioca, etc.
5. Trade in the neighbourhood of the Malay Peninsula centres on Singapore, one of the greatest entrepôts in the world.
6. At the coaling stations in Ceylon, Singapore, Penang, the great coal producers of the East, namely, India, Japan and Australia, compete with the United Kingdom in keeping up the stocks of coal for the merchant and naval ships.

QUESTIONS.

1. Describe the chief products of the Straits Settlements and the Federated Malay States, their chief ports, and the trade routes from them to Australia and Britain respectively. (U.M.)
2. Describe Ceylon, making particular mention of the climate, productions, and class of labour employed on the island. (S.A.)
3. Draw up a list of the British possessions in Asia and Africa giving the capitals and chief articles of export of each. (N.S.W.)
4. What are the chief trade routes that meet at Singapore? Why is it important as a naval station? (U.Mad.)

40. Non-British Asia.

1. On an outline map of Asia write the word High in the centre of the Asiatic high pressure area (Fig. 22), and the word Low in the centre of the Asiatic low pressure area (Fig. 23).

Join these words by a line. Write on your map a summary of the climatic and vegetation regions to the north and north-west, and also to the south and south-east of the line you have drawn.

2. Examine the physical map of Asia (Fig. 53). On what kind of land does the line drawn in the last exercise pass? What kind of land is to the north and north-west? Name the Asiatic rivers which flow to the south and south-east of this line.

Examine the isohyet of 25 inches per annum (Fig. 8). How is this isohyet situated with regard to the line marked in previous exercise? What line roughly divides Asia into two parts, the important and the unimportant?

Position.—Asia consists definitely of two areas, which are roughly separated by a line which runs from **Kashmir** to **Sakhalien**. This line separates the arid regions where the annual rainfall is

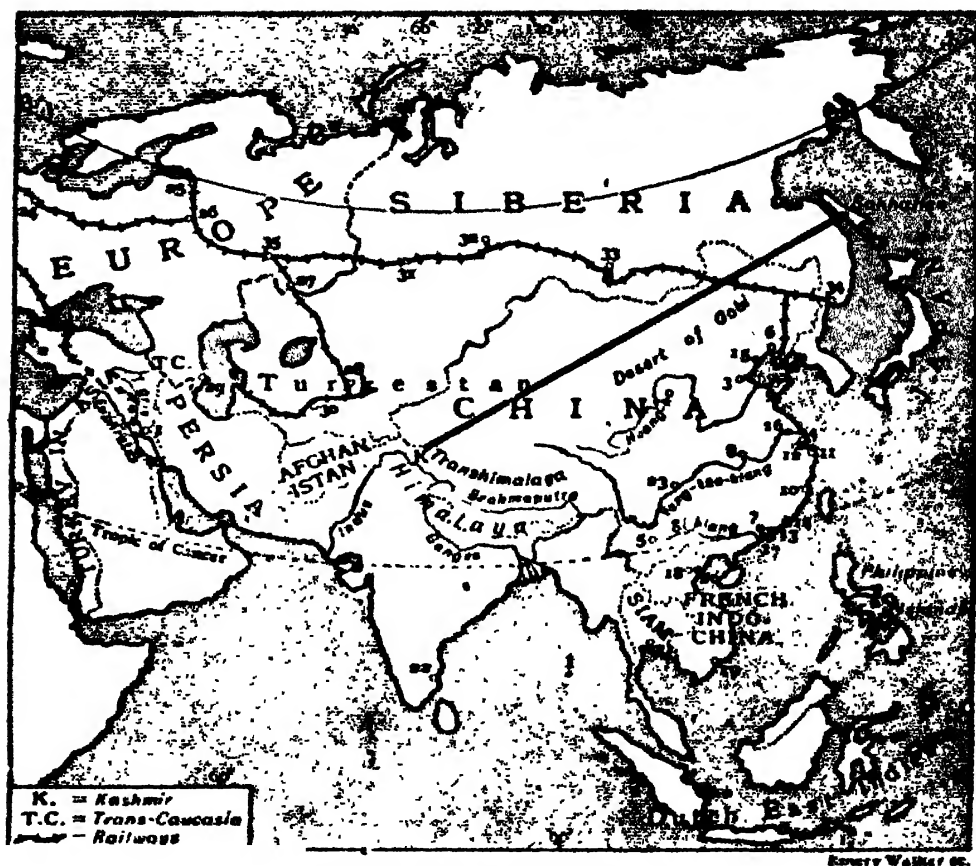


FIG. 62.—NON-BRITISH ASIA.

Towns—

- | | | | |
|---------------|------------------|---------------------|-------------------|
| 1. Bagdad. | 10. Foochoo. | 19. Saigon. | 28. Tashkent. |
| 2. Smyrna. | 11. Ningpo. | 20. Haiphong. | 29. Baku. |
| 3. Tientsin. | 12. Hangchau. | 21. Bangkok. | 30. Bokhara. |
| 4. Shanghai. | 13. Kowloon. | 22. Pondicherry. | 31. Omsk. |
| 5. Yunnan. | 14. Swatau. | 23. Chinking. | 32. Tomsk. |
| 6. Newchwang. | 15. Chinwangtao. | 24. Berlin. | 33. Irkutsk. |
| 7. Canton. | 16. Chunking. | 25. St. Petersburg. | 34. Vladivostock. |
| 8. Hankau. | 17. Hong Kong. | 26. Moscow. | 35. Samara. |
| 9. Chefoo. | 18. Hanoi. | 27. Orenburg. | 36. Port Arthur. |

less than 25 inches per annum from the regions where the rainfall is more than this amount, and where in places there is the heaviest rainfall in the world (Fig. 62).

This line roughly coincides with the mountain axis of Asia, and separates the northern and north-western plains and plateaus from

the area which is much cut up by the rivers which flow into the Indian and Pacific Oceans. At the same time this line separates the grass land and temperate forest areas, which shade off into the cold deserts, from the area which is dominated by the summer rains which we call monsoons. On the coast lands of the monsoon areas there are forests which are temperate in the colder north, and tropical in the equatorial regions to the south.

This line, in addition, separates the area in which occur the parts of the British Empire which are in Asia from the region which is either independent or contains parts of the Russian and Turkish Empires.

The north and north-west of this line is comparatively unimportant, but the part of Asia which lies to the east and south-east and south, and contains British Asia, is important.

The main parts of this area which are non-British are Japan (Chapter 41), China, Siam, French Indo-China and the East Indies.

The independent and unimportant States are Persia and Afghanistan.

The parts of the Turkish Empire are Asia Minor and Arabia.

The parts of the Russian Empire are Siberia, Turkestan and Trans-Caucasia.

The north and north-west.—Arabia and Persia with Afghanistan are desert or semi-desert areas which resemble the desert of the Sahara. The region between the rivers Tigris and Euphrates is a fertile region, similar to the fertile region of the Nile strip, and hence Bagdad has the importance of Cairo, but there is no great port which has so great an importance as Alexandria. The Persian Gulf is a backwater from the world's traffic, and hence no great port has grown up on its shores.

PRODUCTS OF WESTERN ASIA.

COUNTRY.	PRODUCT.
Persia	Wheat (p. 69), cotton, silk, opium, rice
Afghanistan .	Wheat, rice, millet
Turkey in Asia .	Wheat (p. 69), sheep (p. 70), Mediterranean produce
Asiatic Russia .	* Wheat ($\frac{1}{4}$), oats ($\frac{1}{4}$), horses ($\frac{1}{4}$), cattle ($\frac{1}{4}$), sheep and goats ($\frac{1}{4}$), forests ($\frac{1}{4}$)

* The fractions show approximately the share of the total produce of the Russian Empire which is produced in Asiatic Russia.

The table shows the products of this area to be mainly agricultural. The importance of Turkey in Asia lies in its Mediterranean produce (Chapter 12), which provides for the trade of *Smyrna*, the chief port.

The importance of Asiatic Russia is indicated by the fractions which are given in the table, and is largely due to the increase in the productivity of this region since the opening of the railways from Europe to the Pacific Ocean on the east, and to Turkestan on the south-east. These railways are shown in Fig. 62.

The south-east.—The most important parts of Asia to the south-east and east are China and Japan: Japan is considered in the next lesson; and some facts are given with regard to China in the next few paragraphs. Details with regard to China, however, can only be obtained in some cases; hence, although it is known that China is an agricultural country like India and Japan, no facts as regards the cereals and animals of China can be given in the tables on pp. 69-71.

CLIMATES IN CHINA.

	MONTHS.												YEAR.
	1	2	3	4	5	6	7	8	9	10	11	12	
NEWCHWANG.													
T.	15	23	34	50	62	72	75	77	67	55	42	20	49
P.	+36	+27	+10	-3	-18	-30	-27	-25	-4	+11	+20	+30	+2
R.	—	—	—	—	1	2	6	5	3	1	1	—	19
TIENTSIN.													
T.	20	30	40	53	64	73	77	80	70	60	45	32	54
P.	+40	+30	+12	-2	-19	-32	-29	-26	-6	-12	+28	+30	+1
R.	—	—	—	1	1	2	5	5	3	1	—	—	18
SHANGHAI.													
T.	35	37	50	56	67	76	81	81	73	67	53	40	60
P.	+35	+26	+12	-1	-17	-27	-29	-26	-10	+10	+21	+30	+2
YUNNAN.													
T.	55	57	63	72	78	84	86	85	81	75	67	60	72
P.	+20	+10	—	-10	-27	-36	-38	-36	-13	—	+8	+12	-9
R.	—	—	1	4	8	9	8	12	4	2	1	1	50

Chinese climates.—The most important fact with regard to the climate of China is the great variation in pressure which occurs annually: this has been shown in Fig. 14 as the variation in pressure of the region H. 1.

In consequence of this variation, which affects the pressures of **Tientsin, Shanghai, etc.**, as shown in the table above, China has practically the greatest variation in temperature from summer to winter of any part of the earth's surface, and the rainfall tends to be very heavy during the summer months.

From these considerations it follows that the coast lands of China do **not** have what is called an **insular climate**, the climate is one of extremes, since China, especially towards the north, has an exceptionally cold winter and an exceptionally warm summer.

In this respect the climate is a very different coast climate from that of the shores of the north-eastern Atlantic Ocean, which has been noted in relation to the winter gulf of warmth (p. 25).

Chinese products.—China produces raw materials and food-stuffs, chiefly silk, tea, rice and wheat.

CHINESE SILK TRADE IN 100,000 LBS.

Kind.	Total to all Countries	To France.	Italy.	U.S.A.	Hong Kong.	India.	Japan.	From Chinese District.
White, raw - -	101	23	8	14	49	-	-	Shanghai, Canton
Yellow, raw - -	17	3	2	-	-	7	-	Hankau, Chinking
Wild, raw - -	36	13	5	5	-	-	5	Chefoo, Newchwang
Cocoons - -	18	3	-	-	5	-	9	Shanghai, Canton
Waste - -	117	39	9	-	37	-	-	Shanghai, Canton
Refuse silk cocoons	29	21	5	-	-	-	-	Chungking
Piece goods, etc. -	24	2	-	-	16	-	-	Shanghai, Chefoo

Chinese **silk** is largely sent to France and Italy, while much of it goes to Hong Kong, and from thence ultimately to the United Kingdom.

Russia, the United States, and the United Kingdom take most of the **tea** which is exported from China. In the case of Russia a large proportion is obtained by way of the European ports.

CHINESE TEA EXPORTS IN 1,000,000 LBS. TO :

Kind.	Total to all Countries.	United Kingdom.	Hong Kong.	United States.	Russia.			From Chinese District.
					(i) European Ports.	(ii) By Land.	(iii) Pacific Ports.	
Black	86	18	12	10	10	6	16	Hankau, Foochoo
Green	33	3	—	15	—	—	10	Hangchau, Ningpo
Brick	77	—	—	—	6	27	41	Hankau

CHINESE RICE AND WHEAT EXPORTS IN 1,000,000 LBS.

From Chinese District.					Rice	Wheat.
Wuhu	-	-	-	-	6900	6
Shanghai	-	-	-	-	2400	15
Hankau	-	-	-	-	—	47
Others	-	-	-	-	1900	22
Total	-	-	-	-	11200	90

China exports large quantities of rice and smaller quantities of wheat; but the fact that Kowloon imports rice (table, p. 211) tends to show how difficult it is to transport any article from one part of China to the other.

CHINESE EXPORTS.

Article.	Total.	From Chinese District.	To (showing quantity).
Coal 10 ³ tons	12	Chinwangtao, Hankau	Hong Kong (7), Japan (2)
Iron ore - do.	110	Hankau	Japan (110)
Pig iron - do.	30	Hankau	Japan (27)
Raw cotton 10 ⁶ lbs.	105	—	Japan (97)
Opium - do.	4	Chunking	French Indo-China (3)
Lamphor - do.	2	—	Hong Kong (2)
Sugar - do.	71	Swatau, Kowloon	Hong Kong (65), Macau (5)
Wool - do.	39	Tientsin	United States (31)

Chinese exports.—Other exports from China are shown to be coal, iron ore, wool, cotton, and camphor. Just as China both imports and exports rice, she also imports and exports coal, opium and sugar. The map, Fig. 62, shows that these various methods of trading are dependent upon water communications and the situation of the ports.

CHINESE IMPORTS.

	Total.	From.	Into Chinese District.
Opium · 10 ⁶ lbs.	7	Hong Kong (5), India (2)	Shanghai, Canton
Cotton goods · £10 ⁶	14	United Kingdom (9), United States (3)	Shanghai, Tientsin
Cotton yarns · do.	10	United Kingdom (4), Japan (3), Hong Kong (3)	Shanghai, Tientsin
Coal · 10 ³ tons	2039	Japan (1633), Hong Kong (202)	—
Petroleum 10 ⁶ galls.	213	United States (110), Dutch East Indies (48)	—
Rice · 10 ⁶ lbs.	9	Hong Kong (7), French Indo-China (1)	Kowloon
Sugar · do.	7	Hong Kong (5)	—

Chinese imports.—The only articles which China does not both import and export are **cotton goods** and **cotton yarns**, most of which are obtained from the United Kingdom.

CHINESE PORTS.

Port.	Population in 1000.	Value in Million Pounds.	
		Imports.	Exports.
Tientsin · · · ·	800	2·8	0·5
Shanghai · · · ·	651	23·5	16·9
Hankau · · · ·	820	2·8	2·2
Canton · · · ·	900	4·0	5·9
Kowloon · · · ·	—	4·1	2·0

Chinese ports.—**Shanghai** is the most important of the Chinese ports, although it has not quite the largest population. Canton, Kowloon, Hankau and Tientsin follow in order of importance as shown in the table above.

French Asiatic possessions. In India, France possesses about 200 square miles of territory, with a population of about a quarter of a million. The centre of government is Pondicherry, of which particulars as to the climate are given on p. 178. In addition to French India there are to the east of Burma the French possessions on the shores of the Pacific Ocean which are called French Indo-China. This territory has an area of about 300,000 square miles, and a population of about 16 millions.

The climate and productions are of the monsoon type: there is a small production of coal, so that this area resembles China.

The chief town is **Hanoi**, and the chief ports are **Saigon** and **Haiphong**.

Siam.—To the south-west of Indo-China, and in parts having the Mekong as a common boundary, is Siam, with an area about two-thirds and a population of about half those of French Indo-China. Siam is like Burma, forested in the upper mountainous districts, and agricultural in the lowland flats of the rivers. **Teak** is the principal forest product, and **rice** is the chief agricultural product. Like Malaysia, Siam has important **tin** mines.

The capital and chief port is **Bangkok**.

SUMMARY.

1. North and north-west of a line from Sakhalien to Kashmir is dry and arid.
2. South and south-east are the wet monsoon lands.
3. The north and north-west is comparatively unimportant.
4. South and south-east lie British Asia, China and Japan.
5. Turkey in Asia has a Mediterranean climate and produce.
6. Chinese coast lands have a climate of extremes.
7. China produces silk, tea, rice, wheat.
8. Chinese silk is sent largely to France and Italy.
9. Shanghai is the most important Chinese port.
10. France possesses Indo-China and a small part of India, which are monsoon lands.
11. Siam produces teak, rice and tin. Siam trades with Singapore.

QUESTIONS.

1. Contrast the climates of New Zealand and Siberia, pointing out the factors which influence each. (U.S.)
2. Name the chief imports of British India, and the chief exports of China. (Br.Col.)
3. On the accompanying map of Asia mark in three lakes, three rivers, flowing in an easterly direction, the most northerly and the most southerly

cape, Bay of Bengal, Siam, Desert of Gobi, Smyrna, Sarawak, Rangoon, Benares. (S.Aust.)

4. Describe a coasting voyage from Bombay to Zanzibar mentioning the river mouths and ports passed on the way. (U.P.)

5. Account for the fact that the population of Asia is densest in the valleys of the Ganges, Hwang-ho and Yangtse rivers. (Eng.P.C.)

6. Describe and account for the summer climate of (a) Northern Siberia, (b) Southern Japan, (c) Asia Minor. (L.U.)

7. Write a short note on China. (N.Scot.)

41. Japan.

1. Record the area, relief, and the climate limits for Japan.

2. Record the distance from Yokohama to Hong Kong, Singapore, San Francisco and Panama.

3. Record the vegetation region in which Japan lies.

4. Record the population of Japan.

Position.—Japan lies off the east coast of Asia, about latitude 40° N., nearer the equator than the British Isles or the South Island of New Zealand.

Island.	Area in thousand sq. miles.	Percentage of area.	Population in millions.	Density per sq. mile.
Mainland	87	50	37	426
Hokkaido	30	18	1	33
Kiushiu	16	9	8	500
Shikoku	7	4	4	571
Kurile Is.	6	3	—	—
Formosa	14	8	3	214
Sakhalien	12	7	—	—
Rest	2	1	1	500
Totals	174	100	54	310

Size and population.—The whole area is about half as much again as that of the British Isles, and $1\frac{3}{4}$ times that of New Zealand. The mainland, that is the largest island, takes up about half of the area, and is about the same size as the island of Great Britain. In population Japan is about $1\frac{1}{4}$ times that of the British Isles, about ten times that of Australia, while for each person in New Zealand there are about 70 people in Japan.

Nearly three quarters of the population is on the mainland, which has roughly 426 people per square mile, and is therefore one of the densely populated areas in the world.

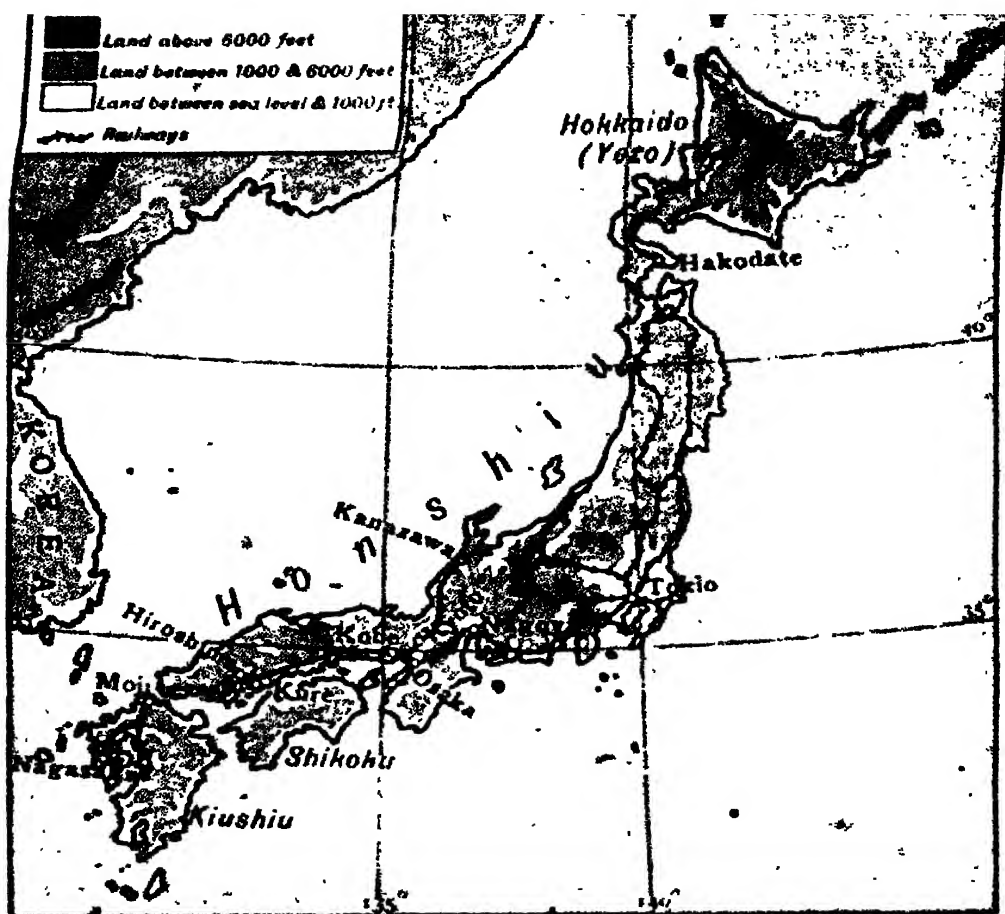


FIG. 63.—JAPAN: RELIEF.

Relief.—The Japanese islands are similar in relief to New Zealand. The ridge of high-land passes north and south, on the whole closer to the west than to the east coasts, but Japan lacks the great plains which are characteristic of New Zealand.

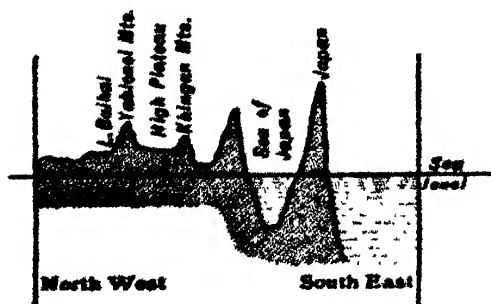


FIG. 64.—SECTION.

The great river valleys contain the only lowland: and the whole country is much more cut up into islands, than is New Zealand.

The coast lands of many of these islands slopes rapidly down to the sea, and thus leaves only a narrow coastal sill.

The main direction of the highland is parallel to the main direction of the highlands of the neighbouring continent; the Japanese Empire thus consists of the southern part of one of the **fastoons of islands** which are a characteristic feature of the coasts of the Pacific Ocean. Fig. 64 shows this connection.

CLIMATES IN JAPAN.

	MONTHS.												YEAR.
	1	2	3	4	5	6	7	8.	9	10	11	12	
TOKIO.													
T.	38	38	44	54	60	68	75	78	71	62 ¹	52	40	56
P.	+3	+5	+1	-3	-8	-13	-15	-15	-8	—	+5	+6	-3
R.	2	3	4	5	6	6	6	4	8	8	5	2	59
Cl.*	4	5	6	7	7	8	7	6	7	7	5	4	6
S.	144	167	149	123	188	198	124	255	152	157	139	204	2000
HAKODATE.													
T.	26	28	34	43	50	60	65	71	65	54	43	32	47
P.	—	—	-3	-4	-12	-14	-15	-15	-8	+4	+5	—	-5
R.	2	2	2	3	3	4	6	6	7	5	4	4	48
Cl.	7	7	7	6	6	7	8	7	7	5	6	8	7
S.	115	132	207	234	258	287	248	228	190	209	133	119	2360
NAGASAKI.													
T.	43	43	49	56	64	71	79	84	76	65	54	48	61
P.	+17	+17	+10	-3	-10	-20	-20	-20	-10	+4	+15	-16	—
R.	3	4	4	9	8	12	10	7	7	5	3	3	75
Cl.	7	6	6	7	5	7	8	4	6	5	5	6	6
S.	110	130	189	155	189	203	161	272	196	187	155	115	2062
TAIHOKU.													
T.	61	58	63	70	79	82	83	84	79	74	68	62	72
P.	+20	+16	+10	-5	-13	-24	-31	-26	-20	-1	+20	+20	-3
R.	3	4	6	5	7	13	9	15	10	5	4	4	85
Cl.	8	8	8	8	7	7	5	5	7	6	7	7	7
S.	56	56	53	112	141	169	234	202	127	156	98	112	1516

* CL = Cloudiness in tenths, S = Sunshine in hours.

Climate.—Japan has a higher average temperature on the whole than either the British Isles or New Zealand, while its range of

temperature from winter to summer is considerably greater than in either of the other island empires.

The changes in pressure are uniform, and consist of a continuous drop in pressure from winter to summer, and a continuous rise from summer to winter; in this respect the Japanese islands are influenced by their proximity to the pressure changes in Central Asia (p. 52).

SEASONAL RAINS IN JAPAN.
(Percentages.) *

	Winter (12-2)	Spring (3-5)	Summer (6-8)	Autumn (9-11)
Tokio	12	25	31	32
Hakodäte . . .	17	17	33	33
Nagasaki . . .	13	28	40	19
Taihoku	13	21	44	22

The rains in Japan occur usually in the warm months, and the winter is always comparatively dry. As a rule the month of June is drier than either May or July; and thus there tend to be two periods of heavy rainfall per annum.

The skies are slightly less cloudy than those of the British Isles, while the sun shines usually for a longer period in Japan than in Britain. The average excess of sunshine in Japan is as great as the average excess of sunshine in France in comparison with Britain, that is, about one hour per day.

Japan is a permanent storm centre, the tracks of the storms or **typhoons** are shown in Fig. 17. The summer months of low pressure are the months of most frequent storms.

Vegetation.—Owing to its heavy rainfall and mountain slopes, Japan is a region of **temperate forests**: the slopes from the central ridge of highland, both to the west and to the east, are tree clad, and only the lowlands of the river valleys are free from trees. The map, Fig 65, shows how largely the proportion of the forest land preponderates.

Vegetation products.—Japan produces about one-ninth of the world's rice (p. 58), very little of the world's wheat, rye or barley (table, p. 69), a small amount of tobacco (p. 56) and tea (p. 59).

In addition to these products, Japan produces about half a million tons of cane sugar, 26 million lbs. of silk, and about half a million lbs. of lacquer. **Formosa** produces about 4 million lbs. each of camphor and camphor oil.

The production of these articles occupies about two-thirds of the population, so that Japan is essentially an agricultural country.

Animals.—There are a few cattle, horses and pigs in Japan, as shown in the table, pp. 70-1. In regard to domestic animals Japan is very backward in comparison with even New Zealand.

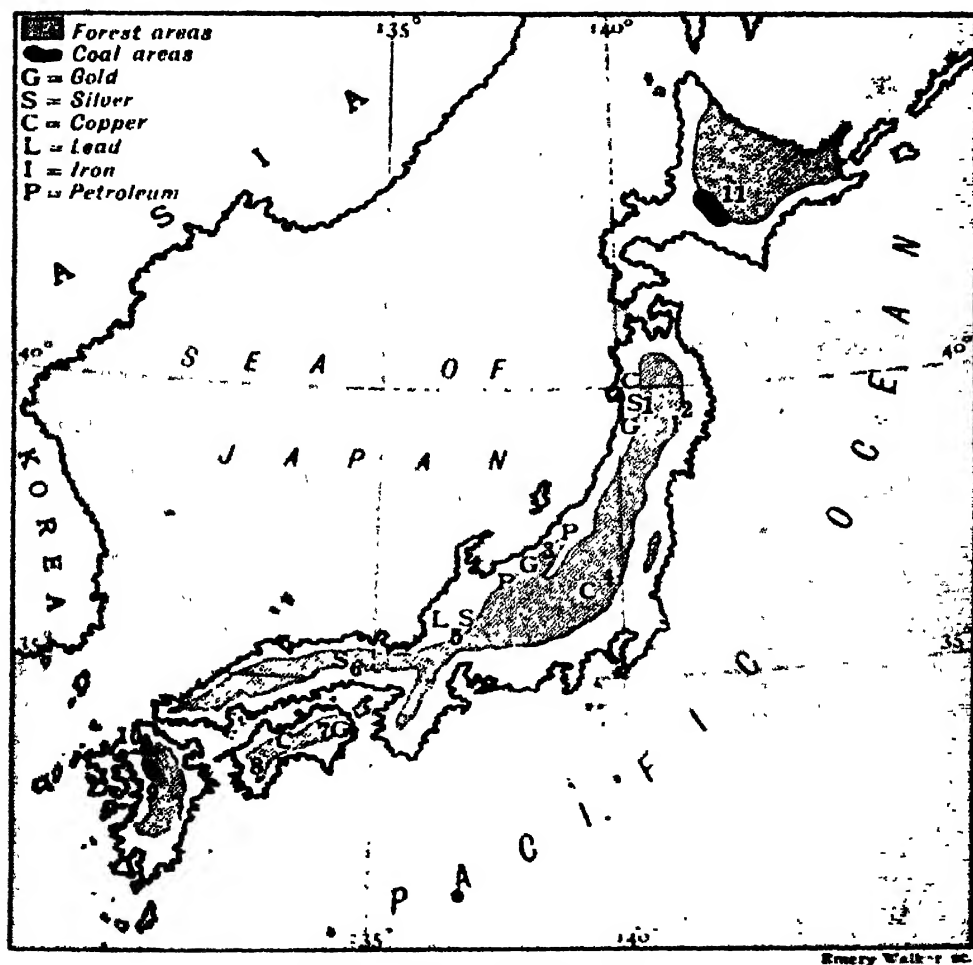


FIG. 65.—JAPAN: FORESTS, MINES.

Under Legend Districts:

- | | | | | | |
|---------------|------------|--------------|--------------|---------------|-----------|
| 1. Akita. | 2. Iwate. | 3. Niigata. | 4. Tochigi. | 5. Gifu. | 6. Hyogo. |
| 7. Kagoshima. | 8. Yebime. | 9. Kumamoto. | 10. Fukuoka. | 11. Hokkaido. | |

Minerals.—Japan is gradually increasing the output from her various mineral deposits, and she is of importance in the Pacific Ocean area for her production of coal and copper. The table shows the principal mining districts marked on the map, Fig. 65.

MINING IN JAPAN.

Minerals.	Total.	Districts.
Gold £10 ⁵	4	Niigata, Akita, Kagoshima
Silver do.	3	Akita, Gifu, Hyogo
Copper 10 ⁴ lbs.	82	Akita, Tochi, Yehime
Lead do.	5	Gifu
Iron do.	16	Iwate
Coal 10 ⁴ tons	13	Fukuoka, Kumamoto, Hokkaido
Petroleum 10 ⁴ galls.	40	Niigata

Railways.—Japan has lacked in the past good means of internal communication, even now there is little wheeled traffic except on the main railways (Fig. 64). The roads are unimportant. This fact is important in connection with the absence of lowland in this mountainous country.

EXPORTS OF JAPANESE PRODUCE.

Article.	Value in £1000.	To Neighbouring Lands.	To Distant Lands.
Silk	10,569	U.S.A. (7105)	France (2296), Italy (1021)
Silk goods	3,640	U.S.A. (1071), India (394), Australia (179)	France (860), United Kingdom (756), Germany (138)
Cotton goods and yarn	3,400	China (2639), Korea (286), Hong Kong (173)	—
Coal	1,653 (2,700,000 tons.)	China (732), Hong Kong (507), Straits Settlements (142)	—
Copper	2,092	China (771), Hong Kong (395), U.S.A. (181)	United Kingdom (331), France (152), Germany (118)
Camphor	329	U.S.A. (117), India (68)	France (64), Germany (49)
Tea	1,159	U.S.A. (1006), Canada (110)	

Exports of Japanese produce.—Japanese exports may be divided into two classes, those which are sent across the ocean

to neighbouring lands, and those which are sent to Western Europe.

Of the neighbouring lands the United States receives almost three quarters of the raw silk, almost one quarter of the silk goods, about one-third of the camphor and nearly all the tea. China takes most of the cotton goods, about half the coal, and about one-third of the copper. There is, in addition to this trade into China, a large trade into Hong Kong of the same goods, much of this trade is finally received in Chinese markets.

The trade to Western Europe is mainly in silk and silk goods, of which the bulk goes to France; there is also some trade in copper, of which about half goes to the United Kingdom. France and Germany receive camphor.

In addition to the exports shown in the table there is a trade in miscellaneous articles exported from Japan, the value of which amounts to about five million pounds. The total value of the exports from Japan is thus about 38 million pounds, of which about 2 million pounds is sent to the United Kingdom.

Japanese imports.—Although Japan is largely agricultural, yet she is unable to grow all the food-stuffs required. The steadily increasing manufactures do not as yet provide for her needs. It thus happens that Japan imports large quantities both of raw materials from neighbouring lands, and of manufactured goods from Western Europe.

JAPANESE IMPORTS.

Article.	Value in £ 1000.	From Neighbouring Lands.	From Distant Lands.
Rice	3,751	India (2090), French Indo-China (903)	—
Wheat flour	736	U.S.A. (728)	—
Sugar	1,998	Dutch Indies (1609)	—
Petroleum	1,440	U.S.A. (948), Dutch Indies (332)	—
Raw cotton	9,452	India (4421), China (2121), U.S.A. (2381)	7
Cotton goods	1,033	—	U.K. (1006)
Woollen goods	1,189	—	U.K. (819), Germany (151)
Iron and steel goods	2,733	U.S.A. (627)	U.K. (998), Germ. (617), Belg. (444)

Japan depends on India for half her rice imports, the United States for flour, the **Dutch East Indian islands** for sugar. Petroleum is supplied by the United States (65 %) and the Dutch East Indies. Raw cotton, which is manufactured into cotton goods for home use and for export to China and Korea, is supplied by India, China, and the United States.

Manufactured goods from Western Europe are chiefly cotton and woollen clothing and iron and steel goods: the United Kingdom supplies nearly all the cotton goods, most of the woollen goods, and more than one-third of the iron and steel goods.

These imports amount to about one half the total imports, which are worth about 44 million pounds per annum, the remaining imports being of a miscellaneous character.

JAPANESE PORTS AND TOTAL TRADE.

	PERCENTAGE OF TRAFFIC.					Value of total trade in £1,000,000.
	Yokohama.	Kobe.	Osaka.	Moji.	Other ports.	
With						
U.S.A.	65	25	—	2	8	20
Australia	50	38	2	—	10	1
China	16	32	23	8	21	14
Korea	5	7	51	1	36	4
India	22	59	5	8	6	6
Hong Kong	7	52	5	21	15	2
Straits Settlements	16	50	1	11	22	1
Philippines	30	42	6	5	17	4
Dutch East Indies	38	20	17	15	10	3
French Indo-China	28	45	—	3	24	9
Siam	10	80	—	—	10	5
Asiatic Russia . . .	7	2	1	1	89	6
Europe (Whole) . . .	53	38	2	2	5	26
United Kingdom . .	46	45	2	1	6	13
France	84	13	3	—	—	4
Germany	46	47	1	3	3	5
World	41	34	9	5	11	—
Values in £10 ⁶ . . .	34	28	7	4	9	82

Japanese ports and total trade.—The bulk ($\frac{2}{3}$) of the Japanese over-sea traffic is concentrated at the two ports of **Yokohama** and **Kobe**, although **Osaka** and **Moji** carry on about one-seventh of this traffic.

Long-distance traffic, over seas to Western Europe, starts usually at Yokohama or Kobe in about equal proportions. While Osaka is the port for China and Korea ; and Moji comes second in importance to Kobe in the trade with Hong Kong.

The trade with Asiatic Russia is largely from the smaller ports, only about one-ninth being from the four ports named in the table.

The next port of importance after the four named in the table is **Nagasaki**, which has a trade of about one million pounds yearly.

The map, Fig. 64, shows the importance of Moji for the trade with the neighbouring lands owing to its position on the west coast. The traffic of Kobe and Osaka should be considered together, as Kobe is practically the outport for Osaka, just as Yokohama is the port for Tokio.

SUMMARY.

1. Japan = $1\frac{1}{2}$ British Isles in area.
2. Japan has little lowland.
3. Japan is very wooded.
4. Japan is a permanent storm centre — typhoons.
5. Japan produces sugar, silk and $\frac{1}{3}$ world's rice.
6. Formosa produces camphor.
7. Japan produces coal, and competes with India and Australia in the ports of the Pacific and Indian Oceans.
8. Japan is agricultural: mining and manufacturing are being developed.
9. Yokohama and Kobe are the chief ports.

QUESTIONS.

1. Give an account of the climate and productions of Japan. How do the position and physical features of the country affect its climate? (U.P.)
2. Describe, in outline, the chief physical features, surface, climate, industries, and trade of Japan. (U.M.)
3. Discuss briefly the commercial possibilities of (a) India, (b) China, (c) Japan. (Auck.U.)
4. Describe the ports one would be likely to visit on a voyage from East Australia to Japan. (U.S.)

5. Describe the foreign trade of Japan, sketch the main lines of its transport, and state what commercial developments are likely to take place between Japan and Australia. (U.A.)

6. Draw a rough sketch map illustrating the trade route between Melbourne and Japan, showing at least six possible points of call. (U.M.)

42. Special Features.

1. Compare the relief map, Fig. 66, with Figs. 1 and 2. Imagine a line drawn from Sakhalien through Kashmir to Bagdad and Smyrna. Describe the physical features (i) close to this line, (ii) to the north and north-west, (iii) to the south and south-east.

2. Look up the Trans-Siberian Railway, Fig. 62. Imagine this line drawn on Fig. 66. Describe the relief of the country passed through by the railway from west to east. How does the railway attain the plateau east of Lake Baikal?

High plateaus.—The main feature of Asia is the high plateau land which stretches from Asia Minor through Iran, Tibet, to the north-east of the continent.

The edges of the plateau are the high mountains of the Caucasus, the Himalayas, etc. These mountains drop from great heights on one side to the lowland almost to sea level, and on the other side to the high plateau, so that one slope is only about half the length of the other (Fig. 64). On the plateau are other mountain chains, such as the Trans-Himalaya, which rise from the plateau by comparatively short slopes to heights almost equal to the mountain edges or escarpments.

The plateau lands are arid and sandy, and are visited by great wind storms, which frequently blow from the west or south-west and cover villages and fields with sand. The whole plateau area thus tends to become desolate, and the explorer finds deserted fields.

The tops of the mountains are snow-covered, and hence enormous glaciers lead down to the plateaus. Fig. 67 shows the snow-

Himalayas north of Darjiling; the central peak is Kin-jing. Fig. 68 shows a frozen waterfall near the route from India into Tibet.

Deposits of coal and petroleum are found near the edge of the plateau in Caucasia, India, Burma, China and Japan.

To the north and north-west the land drops in wide terraces to the low plains which border the Arctic Ocean.



FIG 66.—EURASIA : RELIEF.

The **Trans-Siberian Railway** crosses these plains and terraces to Lake Baikal, attains the high plateau by the deep trench of a river valley to the east of that lake, and then drops to the termini on the Pacific Ocean, Vladivostok and Port Arthur (Fig. 62).

The festoons of islands which fringe the shores of Asia lie roughly parallel to the line of the high plateau. Japan contains

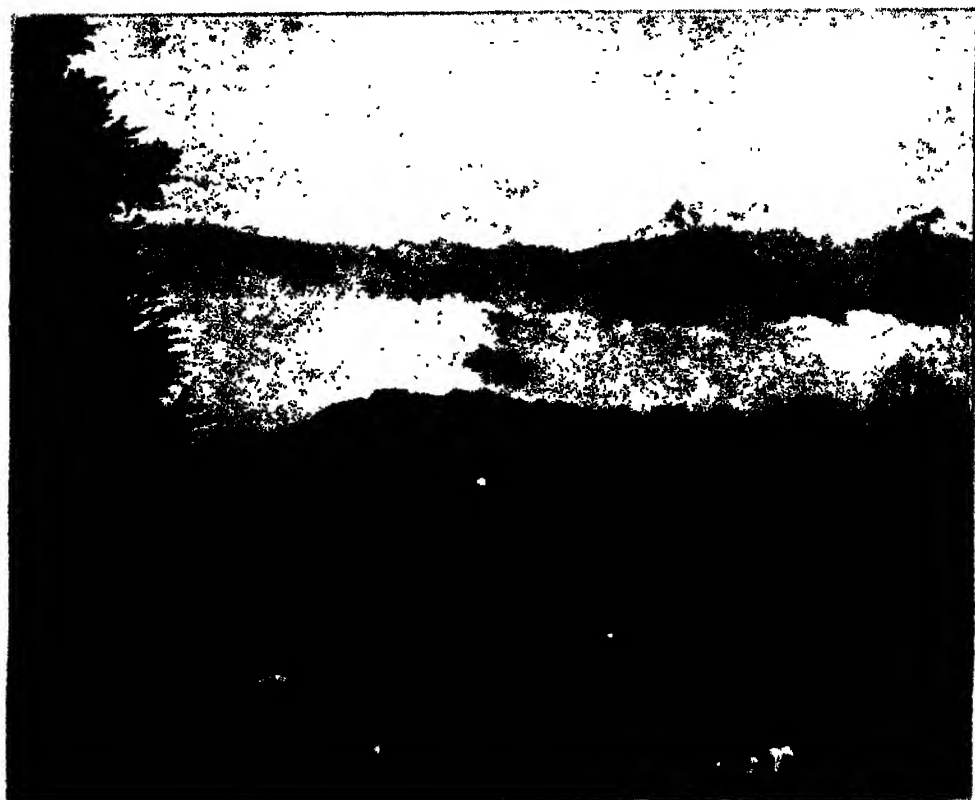


Photo - Underwood & Underwood

FIG. 67.—THE HIMALAYAS AND DARJILING.

the volcano of Fuji-Yama, and there are many traces of volcanic action along the edges of the plateau. Japan is visited by earthquakes, which indicate that the level of the land is not settled. These disturbances show that the earth movements which have produced the great mountains are still in progress.

The high plateau is roughly the water parting of Asia: it separates the rivers which are commercially useful—because they flow into the Indian or Pacific Oceans—from those which either never reach the sea or reach the frozen Arctic Ocean.



Geographical Journal, May 1908.

FIG. 68.—A FROZEN WATERFALL.

SUMMARY.

1. The high plateaus of middle Asia divide it into two parts.
2. The south and south-east is populated and agricultural.
3. Coal and petroleum occur on the edge of the plateau.
4. Volcanoes are extinct or active along the edges of the plateau.
5. The plateaus are arid and sandy.
6. The high mountains have glaciers.

QUESTIONS.

1. Write a general account of the monsoons, explaining, with the aid of diagrams, their cause, the particular directions in which they blow, and mentioning typical localities in which they occur. (U.M.)

2. Describe fully the chief physical divisions of India, its climate productions and economic importance. Mention the chief political divisions and six towns of importance, and describe its method of government. (U.M.)

3. "It would be well for India if the wall of the Himalayas had no gate." Discuss this statement with regard to the physical features of India and its internal and external means of communication. (U.S.)

4. Draw a map of India, and mark on it (a) the meridian of 80° E. and the tropic of Cancer, (b) the Vindhya hills and the Satpura hills, (c) the provinces under British administration and their capitals. (U.Cal.)

5. Draw a map of India or Australia showing the mountains, rivers, principal cities, and commercial products. (Alb.)

6. Discuss the economic products of three of the following regions in regard to their physical conditions, (a) the Assam valley, (b) the Deccan plateau, (c) the Panjab plains, (d) Upper Burma. (N.U.)

7. Give an account of the summer and winter monsoons in India. Show that in each case their scientific cause accounts for their regularity. (B.Col.)

8. Trace the route of quickest transit from Lahore to Madras, from Calcutta to Bombay, and from Bombay to London. What alternative routes exist between these cities? (U.P.)

9. Describe the route of the Trans-Siberian railway. (C.U.L.)

SECTION IV.

THE AMERICAN CONTINENT.

43. The Americas.

1. Record the areas and dimensions of the two land masses.
2. Record what fractions of the land mass of North America is included in Canada, and what fraction of South America is included in Argentina.
3. Record the estimated percentages of lowland, upland, and mountain in each of the land masses.
4. Record the distance from Para and from New York to Plymouth ; from San Francisco to Yokohama and to Auckland.

Position.—The **Americas** separate the two great oceans, and communicate across the Atlantic to the western world and across the Pacific to the eastern world : on the western shores, at San Francisco, Puget Sound, and Victoria, the east-bound traffic and the west-bound traffic from Western Europe meet.

Size and population.—North America contains about $8\frac{1}{2}$ million square miles, and South America about 7 million ; the facts for the various countries are given below. •

STATE.	Area in 1000 sq. mi.	Percentage of N. or S. America.	Population in 1000.	Density per sq. mi.
Canada	3,730	45	7,231	2
United States . .	3,571	43	88,566	24
Argentina	1,117	16	6,806	6
Brazil	3,290	47	20,000	6
Chile	290	4	3,254	11

Canada and the United States are about the same size as Australia, and Canada has a slightly larger population than that continent ; but the population of each of these British Dominions is much

smaller than that of the United States. **Brazil** has both the largest area and the greatest population of the South American States,



FIG. 69.—NORTH AMERICA: RELIEF.

while in the **Argentine Republic** there are more people than in **Canada**, and they are distributed over a smaller total area.

Relief.—The broad features of the relief of the Americas (i) are the great mountain masses which lie close to the west coast from

north to south; (ii) the low plains towards the Arctic, which are similar to the low plains in the north of Eurasia; and (iii) the uplands near the east coast with the lowlands which these enclose. The east coast uplands are those of **Labrador**, the **Appalachians**, and the **Highlands of Brazil**: the lowlands which are enclosed are the **Mississippi valley**, the **Amazon valley**, and the valley of the **Parana** (Figs. 69 and 1).

The western shores have practically no coastal sill, and the eastern shores have narrow sills such, for example, as that to the east of the Appalachians. On the west coast there is the long narrow valley which approaches the sea by a gap at **San Francisco**. A similar valley, which has been drowned, is the **Gulf of California**, while the island of **Vancouver** is the western edge of a third valley of the same kind. Valleys of this kind are typical of the shores of the Pacific Ocean.

Rivers.—The great rivers of America are shown in the table, which includes some of those considered in Chapter 3.

RIVER.	Length in miles.	Area of Basin in sq. miles.	RIVER.	Length in miles.	Area of Basin in sq. miles.
St. Lawrence	1,034*	297,000	Mississippi	2,616†	1,239,000 ‡
Mackenzie	1,100	—	Rio Grande	2,200	—
Fraser	740	138,000	Orinoco	1,550	370,000
Columbia	939	250,000	Amazon	3,380	3,356,000
Hudson	300	16,000	Parana †	2,170	1,200,000

* From the end of Lake Ontario to the sea.

† Parana—La Plata together.

‡ Mississippi-Missouri 4194.

§ About 41 % of the area of the United States.

One great feature of the longest of these rivers is the extremely slight average fall per mile on their lower courses. On the

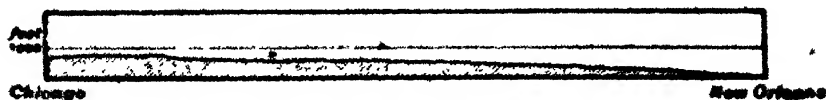


FIG. 70.—SECTION NEAR THE MISSISSIPPI.

Mississippi the fall from **St. Louis** to the sea is less than 500 ft., thus making an average fall of less than 6 in. a mile, while for the last 400 miles the fall is only about half this amount. The flatness of the **Mississippi Valley** is shown by Fig. 70. The fall of the

for the last 2000 miles is almost as slight as that of the lower Mississippi; and the fall on the Parana or the Paraguay is about the same as that on the Mississippi.

This feature is in striking contrast to the conditions on the Congo and the Zambezi, where the 600 ft. contour cuts the river close to the coast; it agrees with the great area of lowland through which the American rivers flow, in distinction to the upland plateau, over which the South African rivers wend their way.

The water-parting round the head waters of the Mississippi is not clearly marked, and that between the head waters of the Plate rivers and the Madeira (the principal tributary of the Amazon) is but *little more definite.

The Mackenzie river flows through a large lowland area, but is bounded rather closely by the mountains on the west; it, however, flows into the Arctic Ocean through a region which is sparsely populated, and has on this account little importance as a means of communication or transport, while the Mississippi has always been valuable as one means of connecting the Middle States (U.S.A.) with the sea.

The Great Lakes.—An alternative route from the Middle States to the Atlantic Ocean has always been found by means of the St. Lawrence and the Great Lakes; and because the St. Lawrence is frozen during the winter months, traffic from Lake Erie has taken advantage of the one important gap in the Appalachians which is marked by the Mohawk and Hudson rivers.

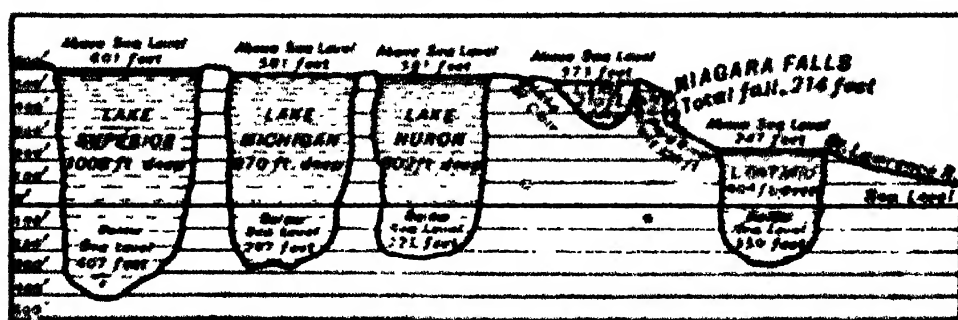


FIG. 71.—THE GREAT LAKES (after T. C. Martin).

Fig. 71 shows a diagrammatic section across the lakes, of which only Lake Erie is entirely above sea level: this figure represents the depths but not the areas of the lakes which are mere shallow pans; for example, Lake Superior is as large as

Ireland, and is not deep enough to contain the higher uplands of Ireland.

One great difficulty of the St. Lawrence route occurs at **Niagara Falls**, where the river falls 214 feet. The Falls are gradually receding, and have already cut back the gorge shown in Fig. 72. The **Welland Canal** takes the traffic from **Lake Ontario** to **Lake Erie**.



FIG. 72.—THE NIAGARA GORGE.

Panama.—The isthmus of **Panama** joins the land masses, and separates at the narrowest point the Atlantic waters (**Gulf of Mexico**) from those of the Pacific. Across this isthmus a canal is being cut so that ocean-going steamers may pass quickly from one ocean to the other.

This canal will make the western shores of America nearer to the shores of the North Atlantic Ocean for steamships, and will, probably, improve the trade of **P.I.L.** The canal is the counterpart of the Suez Canal.

SUMMARY.

1. From **British Columbia** eastwards the land rises to the **Rocky Mountains**, falls to the **Hudson Bay** depression, rises to the **Laurentian Heights**, and then falls to the sea.

2. From **California** eastwards the land rises to the **Rocky Mountains**, falls to the **Mississippi River**, rises to the **Alleghany Mountains**, and falls to the sea.

3. From **Quito** the land to the east rises and then falls suddenly—the **Andes**—and then falls gently to the sea—the **Amazon valley**.

4. From Valparaiso eastwards the land rises sharply to the Andes, falls slowly to the Parana and Uruguay valleys, and rises gently over the southern extension of the Brazil uplands to fall to the sea.

5. America has mighty rivers.

6. The Panama isthmus is being pierced by a canal.

44. The Americas: Climate and Vegetation.

1. Record the climate factors for both land masses.
2. Record the vegetation regions for both areas.
3. Mark on an outline map the cereal growing and the ranching areas; the deserts; and the forest lands.

Climate regions.--At the polar ends of the land masses of North and South America the winter climate is severe. In the north the winter isotherm of freezing point reaches almost as far south as St. Louis. On the east of **St. Louis** the isotherm passes only slightly north of east, and therefore to the south of **Newfoundland**; on the west, however, this isotherm passes towards the north-west and to the north of **Vancouver**.

The greater part of Canada, and the United States to the north-east, have cold winters. In the summer time, the summer isotherm, 70° F., passes along meridian 120° W., and thus almost the whole of North America has a summer temperature above 70° F. In the map (p. 24) the plateau and mountain region of the west is shown to have a very high summer temperature, but this refers to the temperature at sea level, and a similar correction should be made here as in the case of South Africa (p. 26).

All South America north of Lat. 40° S. has a temperature in summer of over 70° F., and the highlands of Brazil are to be compared with the upland and mountain or the Western United States.

As regards rainfall, in the **Amazon Valley** occur the constant tropical rains, polewards from this valley the summer rains, then on the west sides the arid, almost rainless regions, and further towards the poles the areas of variable rains.

The **Hudson Bay depression** is an area of specially cold winters (p. 25).

NORTH AMERICA. COAST CLIMATES.

	MONTHS.												YEAR.
	1	2	3	4	5	6	7	8	9	10	11	12	
FORT CHURCHILL.													
T.	20	- 15	- 10	10	35	50	59	53	42	29	8	- 10	19
P.	7	5	12	10	- 2	- 9	- 12	- 10	- 7	- 7	3	3	- 1
R.					2	2	4	4	2	1	1	—	16
VANCOUVER.													
T.	34	35	44	47	55	58	60	65	57	50	43	36	49
P.	4	- 2	3	3	2	2	3	2	2	3	7	- 7	1
R.	8	8	3	4	2	5	—	1	3	4	8	8	54
ST. JOHN'S.													
T.	22	22	27	35	44	52	57	50	50	45	40	30	40
P.	- 15	- 15	- 15	- 15	5	7	—	- 5	- 2	- 5	- 15	- 15	- 9
R.	4	2	2	4	2	2	2	4	4	4	4	4	38
LOS ANGELES.													
T.	54	55	57	60	63	67	71	72	70	64	60	56	62
P.	12	4	3	- 3	- 7	- 13	- 10	- 15	- 13	- 7	4	5	- 3
R.	3	3	3	1	—	—	—	—	—	1	2	3	16
CHARLESTON.													
T.	50	52	58	65	73	79	82	81	76	67	58	51	66
P.	17	17	7	5	3	5	6	6	7	11	15	17	10
R.	4	3	4	3	4	5	7	7	6	4	3	3	53

RAINY SEASONS. PERCENTAGES.

	Spring.	Summer.	Autumn.	Winter.
Fort Churchill	12	63	25	—
Vancouver	17	11	28	44
St. John's	21	21	31	27
Los Angeles	25	—	19	56
Charleston	21	35	25	19

Coast climates in North America.—The table given above affords evidence of the following facts for the coast towns named

and for their neighbourhoods. **St. John's** on the east is colder and rainier than **Vancouver** on the west ; but **Charleston**, further south on the east, is colder in winter but hotter in summer than Los Angeles in a corresponding latitude on the west. **Los Angeles** has definitely winter rains, and should be compared with **San Francisco** (p. 49), while **Charleston** has an excess rainfall during the summer, and typifies the tendency of the summer rain region to extend polewards on that side of an arid region which receives on-shore winds.

Coast climates in South America.—All the coast towns mentioned for North America have a difference between winter and summer temperatures greater than 18° F. ; but all the towns mentioned in the table below in South America have (except **Buenos Aires**) an annual range of temperature less than 20° F. This exemplifies the greater equability of temperature in the southern land masses, and in this connection it should be noted that the breadth from ocean to ocean is less in the south than in the north. On the whole, also, the southern towns do not experience such great variations in pressure as those in the north. **Cartagena, Guayaquil** have definite summer rains, **Para** has constant rains with the greater fall towards the autumn season, if such a term can be applied to a place which is practically without seasons. **Antofagasta** marks the place where the arid region reaches the west coast, and should be compared with the similar places north and south of the equator on the west coast of Africa. **Valparaiso** shows the commencement of the winter rain region on the west coast, and should be compared with the regions of similar rains in California, near Cape Town, and in south-west Australia. **Rio de Janeiro** has summer rainfall.

Inland towns and their climate.—**Asuncion** and **Lima**, in South America, have smaller annual variations in temperature than **Winnipeg, St. Louis, and Vicksburg**, and in this respect agree with the coast towns. The rainfall at **Vicksburg** is a sample of the almost constant rainfall, with a tendency towards a winter maximum of the Lower Mississippi Valley ; while that of **St. Louis**, like that of **Charleston**, shows the tendency towards a summer maximum on the windward side of the arid regions. The comparative absence of precipitation in winter in **Winnipeg** is an example of the dryness of the atmosphere in very cold areas, when it is even too cold to snow. The rainfall at **Asuncion** should be compared with that in **Northern Rhodesia** (p. 129), while that at **Antofagasta** should be compared with that in the neighbourhood of **Cape Town**.

CLIMATE

SOUTH AMERICA. CLIMATES.

MONTHS.													YEAR.
1	2	3	4	5	6	7	8	9	10	11	12		
CARTAGENA. Lat. 10° N.													
T.	73	75	80	81	83	85	83	82	83	80	81	80	81
P.	-10	-10	-10	-12	-12	-12	-12	-12	-12	-12	-13	-11	-12
R.	—	—	—	—	4	5	3	5	5	9	5	1	37
GUAYAQUIL. Lat. 30° S.													
T.	75	73	75	75	77	78	75	74	75	73	73	75	75
P.	7	7	10	12	10	12	14	14	12	12	12	10	-11
R.	1	1	1	1	4	2	1	1	1	1	1	1	16
PARA. Lat. 1° S.													
T.	82	82	83	83	83	82	80	79	80	80	82	83	82
P.	10	10	-11	-12	20	-20	17	-12	-12	12	-10	10	-13
R.	5	5	4	3	2	6	12	14	14	13	10	6	94
ANTOFAGASTA. Lat. 23½° S.													
T.	59	60	62	66	69	70	70	70	69	68	67	62	66
P.	7	7	8	8	-3	-6	-9	-7	-6	-2	2	7	—
R.	—	—	—	—	—	—	—	—	—	—	—	—	—
RIO DE JANEIRO. Lat. 23½° S.													
T.	65	68	73	75	77	78	80	80	80	76	71	70	74
P.	13	13	8	-2	-6	-10	-15	-10	-4	2	2	7	—
R.	2	2	2	3	4	6	5	4	6	5	4	2	45
VALPARAISO. Lat. 33° S.													
T.	53	53	59	60	65	69	69	69	60	61	60	55	62
P.	7	7	9	8	-3	-4	10	-7	-5	—	3	12	-2
R.	7	3	—	—	—	—	—	—	1	—	2	6	19
BUENOS AIRES. Lat. 35° S.													
T.	50	52	55	61	66	72	73	72	69	61	55	52	62
P.	+2	+2	+2	-2	-12	-20	-20	-14	-10	+6	-4	+1	-7
R.	2	2	3	4	3	4	3	3	5	3	3	3	38

RAINY SEASONS. PERCENTAGES.

	Spring.	Summer.	Autumn.	Winter.
Cartagena	11	32	54	3
Guayaquil	37	25	19	19
Para	10	34	39	17
Antofagasta	—	—	—	—
Rio de Janeiro	20	33	33	14
Valparaiso	—	—	16	84
Buenos Aires	26	26	30	18

AMERICA. INLAND CLIMATES.

MONTHS.														YEAR.
WINNIPEG. Lat. 50° N.														
T.	-5	0	15	38	52	63	68	64	53	40	20	5	34	
P.	17	17	12	2	7	13	12	7	7	2	7	7	1	
R.	1	1	1	2	2	3	3	3	2	2	1	1	22	
ST. LOUIS. Lat. 39° N.														
T.	32	34	44	57	66	76	80	78	70	59	44	30	56	
P.	17	12	7	—	5	5		2	6	10	12	10	6	
R.	2	3	3	3	4	5	4	3	3	2	3	2	37	
VICKSBURG. Lat. 32° N.														
T.	48	52	58	66	73	80	82	81	76	66	56	50	65	
P.	17	13	5	—	4	4	3	2	4	10	16	17	6	
R.	6	5	6	5	5	4	4	3	3	3	4	5	53	
ASUNCION. Lat. 25° S.														
T.	66	67	70	73	77	81	81	81	79	72	66	63	73	
P.	-26	-29	-35	-36	-43	-47	-47	-44	-40	-33	-29	-24	30	
R.	2	1	2	5	6	4	8	7	6	4	4	3	52	
LIMAY. Lat. 39° S.														
T.	42	46	50	59	66	72	76	73	66	59	51	43	59	
P.	+2	+5	—	-3	-10	-17	-18	-15	-11	-4	-3	-1	-6	
R.	1	1	1	1	1	1	—	—	—	—	1	1	8	

RAINY SEASONS. PERCENTAGES.

	Spring.	Summer.	Autumn.	Winter.
Winnipeg	23	40	23	14
St. Louis	27	32	22	19
Vicksburg	30	21	19	30
Asuncion	29	36	27	12
Lima	38	12	12	38

Vegetation regions.—From the tropical forests of the Amazon Valley we pass polewards through the summer rain grass lands of the Paraguay and Orinoco valleys, to the hot desert areas of Chile and Arizona, Texas and Mexico. On the east side of these hot desert areas and towards the poles lie the temperate grass lands, and beyond these the temperate forests of Patagonia, and of the Eastern United States and Eastern Canada. Round the shores of the Arctic Ocean, here, as in Asia, is the tundra, the frozen desert.

Australia makes more use of its grass lands for cereals and ranching than Africa; South America—in Argentina, Uruguay, Paraguay—competes with Australia, but all these southern lands provide much smaller quantities of cereals, and pasture many fewer animals, than the prairie lands of the United States and Canada. On the American grass lands, arable farming occurs on the wetter east, and ranching on the drier west (p. 265).

In Brazil and in the South-east United States on the windward coasts occur vegetation regions favourable under their special climatic circumstances to the growth in the first case of coffee, and in the second case of cotton and tobacco. The climate and coffee growing of Brazil should be compared with the climate and coffee growing of Arabia: while the cotton and tobacco growing in the United States should be compared with similar growths in Egypt: in all cases there is a sufficient water supply in a land which is on the edge of a hot desert area.

SUMMARY.

1. America has tropical heat and rainfall in the Amazon Valley; desert and arid regions on the polar sides of this, in Chile and Mexico, etc.

2. Dry grass lands in the interior and forested lands towards the wetter coasts lie beyond the deserts nearer the poles.

3. The tundra region of North America is marked by exceptional cold in winter and by frosty nights even in summer (Fig. 73).
4. America produces cereals, pastures animals and grows cotton, coffee, tobacco and rubber.

QUESTIONS.

1. Compare the climates of the eastern and western parts of South America and explain the causes of the differences. (U.S.)
2. Compare and contrast the east coast line of South America from the Amazon to Cape Horn with the east coast line of Africa. Mention and locate approximately two of the chief ports and give physical reasons for their existence. (U. Mad.)
3. Briefly compare South America with Africa in respect to configuration, elevation, slope, position of mountains and rivers, density of population and probable rapidity of industrial development. (L. U.)
4. Describe the chief topographical features of North America between San Francisco and New York. (N. U.)
5. Compare South America with North America in relief and with Africa in climate. (Newf.)
6. Describe the different belts of vegetation which would be crossed in passing southwards over the Central Lowlands of North America from the Arctic Ocean to the Gulf of Mexico, and point out how the climatic conditions differ in each belt. (L. U.)
7. Draw a rough section across the middle of North America from east to west. How has the direction of the mountain system affected (a) the flow of the principal rivers, (b) the annual range of temperature in the interior, (c) the rainfall on the coastal plains? (Eng. P.C.)
8. Into what natural regions would you divide North America? Contrast the climate and productions of the Pacific and Atlantic seabords and give reasons for the differences. (C. W. B.)

45. Canada.

1. Record the climatic and other facts regarding Canada.
2. Examine that part of Canada south of the latitude of London ($51\frac{1}{2}^{\circ}$ N.); in what striking ways does it differ from the remainder?
3. Find the distances from Winnipeg to Vancouver, Toronto, Montreal, Quebec and Halifax.

Position.—Canada lies right across North America, north of lat. 49° N., the Great Lakes and the St. Lawrence river. In the east the three maritime states—**New Brunswick, Nova Scotia and Prince Edward Island**—are on the south side of the mouth of the St. Lawrence.



FIG. 73.—CANADA: RELIEF.

Every Value to

Size.—Canada is larger than Australia and has a larger population. Both countries have extensive uninhabited areas—Australia in the central desert, Canada in the north and north-west reaching to the desert shores of the Arctic Ocean. The latitude of London ($51\frac{1}{2}^{\circ}$ N.) serves as a rough dividing line between the two parts.

PROVINCES.	Area in 1,000 sq. miles.	Population in 1,000,000.	Per cent.	Density per sq. mile.
Prince Edward Island	2	0.1	1	50
Nova Scotia	21	0.6	9	30
New Brunswick	28	0.4	6	14
Quebec	352	2.1	32	6
Ontario	261	2.6	41	11
Manitoba	74	0.5	5	4
Alberta	254	0.3	1	—
Saskatchewan	251	0.4	1	—
British Columbia	358	0.3	3	—
Territories	2,130	0.1	1	—
Total	3,734	7.4	100	2

The eastern maritime states have the denser population. **Quebec** has the largest area other than the territories—**Keewatin, Mackenzie, Franklin, Ungava, Yukon**—the first three of which are each about as large as Quebec and **Ontario** combined; Ungava is as large as Quebec and Yukon is almost as large as **Alberta**.

Ontario has the largest population.

Relief.—From the Pacific Ocean the land of Canada rises in roughly parallel ridges and valleys to the **Rocky Mountains**. The arms of the sea are drowned valleys, and the coast resembles that of Eastern Asia.

From the Rocky Mountains there is a drop to the foot-hills, and then a succession of broad terraces to the **Lake Region**. On these terraces are the great Arctic-flowing rivers, such as the **Mackenzie**.

The **Lake Region** consists of broad shallow pans or depressions containing the lakes, with broad embossed uplands between the lakes and **Hudson Bay**. The Niagara Falls tumble over the edge of the hard limestone rock which occurs in horizontal sheets, and the water is eroding the softer rocks which lie underneath the limestone (Fig. 75); consequently the Falls are slowly approaching Lake Erie (Fig. 72). The ridge of upland—the **Laurentian**—

is a water-parting between the St. Lawrence and the rivers which flow into James Bay.



FIG. 74.—NIAGARA FALLS.

New Brunswick and Nova Scotia contain the lower end of the upland, which is called the Appalachians further south.

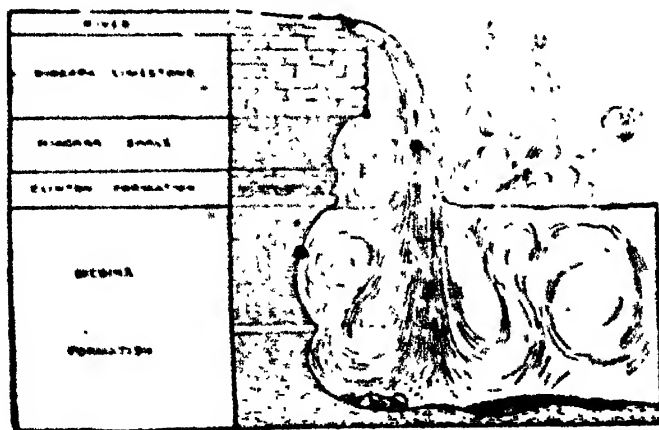


FIG. 75.—NIAGARA FALLS: SECTION.

Rivers.—The St. Lawrence and its one important tributary, the Ottawa, have been described (pp. 10, 230).

W.G.

Q

On the west, the **Fraser** river winds in a narrow valley from the **Rockies** to the Pacific.

On the north, the **Yukon** flows through Alaska to the Arctic Ocean. The **Mackenzie** with its tributaries, the **Peace** and **Athabasca** rivers, and its lakes, drains a large portion of the uninhabited area, and, although navigable, is useless since it flows into the Arctic.

Lake Winnipeg receives the **Saskatchewan**, and its outflow is by the **Nelson River** to Hudson Bay.

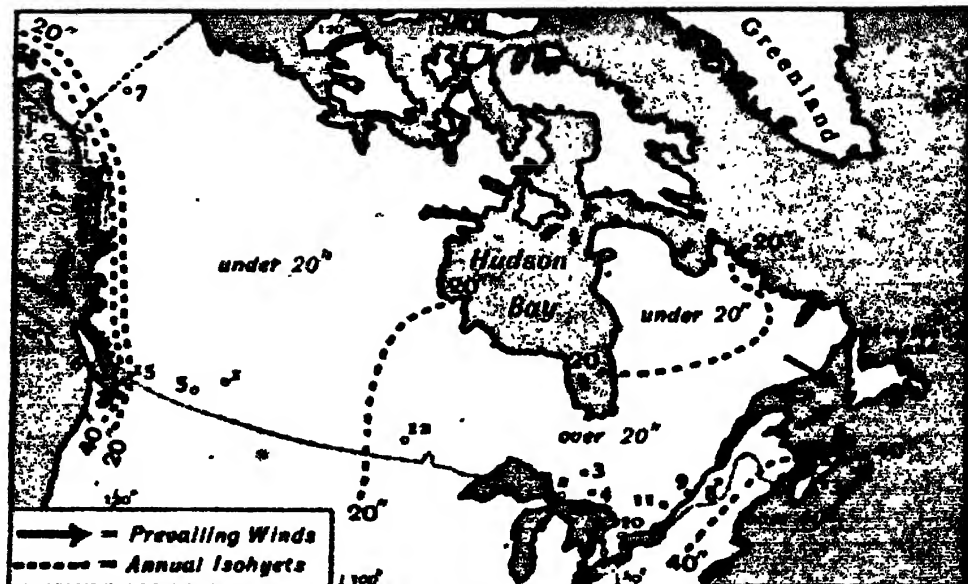


FIG. 76.—CANADA: WINDS AND RAINFALL.

- | | | |
|---------------------|--------------|----------------|
| 1. Radnor. | 6. Nanaimo. | 11. Ottawa. |
| 2. Sault Ste Marie. | 7. Klondike. | 12. Winnipeg. |
| 3. Cobalt. | 8. Lambton. | 13. Halifax. |
| 4. Sudbury. | 9. Montreal. | 14. London. |
| 5. Kootenay. | 10. Toronto. | 15. Vancouver. |

Climate.—In mid-winter the whole of Canada, with the exception of Vancouver Island and the neighbouring mainland, has a temperature below freezing point. The coldest area is in the neighbourhood of north-west Hudson Bay, and the further a place is from this area the warmer it is. Consequently, east of the Rockies, only the St. Lawrence valley has a rainfall of 2 in. in January. From the Rockies to the Pacific the rainfall is gradually heavier, while Nova Scotia has 4 in. of rain in that month.

In July, the populated part of Canada varies in temperature from

50° to 70° F., while there is a rainfall of at least 2 in., except in the valleys of the Upper Saskatchewan and the Fraser.

The interior of Canada tends to have a higher pressure than the low-pressure areas of the North Pacific and Iceland (Chapter 8), and thus the wind is westerly from the Pacific Ocean to British Columbia, and westerly or north-westerly from the land to the North Atlantic Ocean. The on-shore winds of British Columbia and Nova Scotia account for the heavy rainfall on the coast lands (Fig. 76).

Climatically, Canada has therefore three regions, the *wet warm winter region* of the Pacific coast: the *wet colder winter region* of the Atlantic coast with warmer summers than British Columbia: the *dry interior* with cold winters and hot summers.

Vegetation.—The line drawn on the map (Fig. 76) a little north of 1, 12, and 9 would separate two regions. The north has a density of population of less than 26 people per square mile and is forested; in the extreme north the forest changes to tundra.

A narrow strip on both sides of this line contains three regions, the *forested area* of British Columbia west of the Rockies, the *prairie region* east of the Rockies almost to longitude 100° W., and the *mixed wood and grass land* further east.

A large part of Canada is devoted to arable farming; wheat is mainly grown in Manitoba, Saskatchewan and Ontario; oats are grown almost everywhere, but especially in Ontario; and barley is grown largely in Manitoba and Ontario.

CANADA: CEREAL PRODUCTION: ANIMALS.

	Wheat.	Oats.	Barley.	Cattle.	Sheep.	Pigs.
	million bushels.			100,000.		
Ontario	18	90	20	28	11	18
Quebec	1	40	2	16	6	7
Nova Scotia	—	4	—	3	4	1
New Brunswick	—	6	—	2	2	1
Manitoba	45	43	17	4	—	1
P.E. Island	—	5	—	1	1	—
Alberta	6	17	2	10	2	1
Saskatchewan	56	59	4	7	1	3
British Columbia	—	—	1	1	—	—
Total	126	264	46	72	27	32

Canada grows about twice as much wheat, twenty-five times as much oats, and nearly fifty times as much barley as Australia (p. 87). On the other hand, Australia has more cattle, Queensland and Ontario having about the same number. Australia has nearly twenty-five times as many sheep; but Canada has nearly four times as many pigs as Australia (p. 89).

Ontario and **Quebec** are the provinces which have the largest number of animals.

Trade in animal products, etc. — The wool produced in Canada is about 7 million lbs. per annum, mostly coming from **Ontario** and **Quebec**; of this nearly 2 million lbs. are exported (p. 253).

Saskatchewan has a steadily increasing production of cereals, and, according to the latest returns, is the premier Province for both wheat and oats.

DAIRY PRODUCTION IN CANADA.

PROVINCE.	Chief Districts.	Butter in million lbs.	Cheese in million lbs.
Quebec	Drummond, Nicolet, Shefford, Bagot, Stanstead	31	70
Ontario	Dundas, Hastings, Leeds, Oxford, Perth, Lanark	9	130
New Brunswick	Kings	1	1
Prince Edward Island	Queens	—	2
Manitoba	Provencher, Winnipeg	2	1
Alberta	Strathcona, Calgary	2	—
British Columbia	New Westminster	1	—
Total		46	204

The dairy produce of Canada is mainly confined to **Ontario** and **Quebec**, where the majority of the cattle are reared: about half the butter produced is sent to the **United Kingdom**, and nearly all the cheese (p. 253).

The only meat exports of Canada of importance are bacon and live cattle, and practically the whole of these exports are sent to the **United Kingdom** (p. 253).

Canada produces in comparison with Australia practically no wool, about two-sevenths as much butter, but nearly fifteen times as much cheese, while the export of bacon from Canada exceeds the total production of Australia very considerably (p. 89).

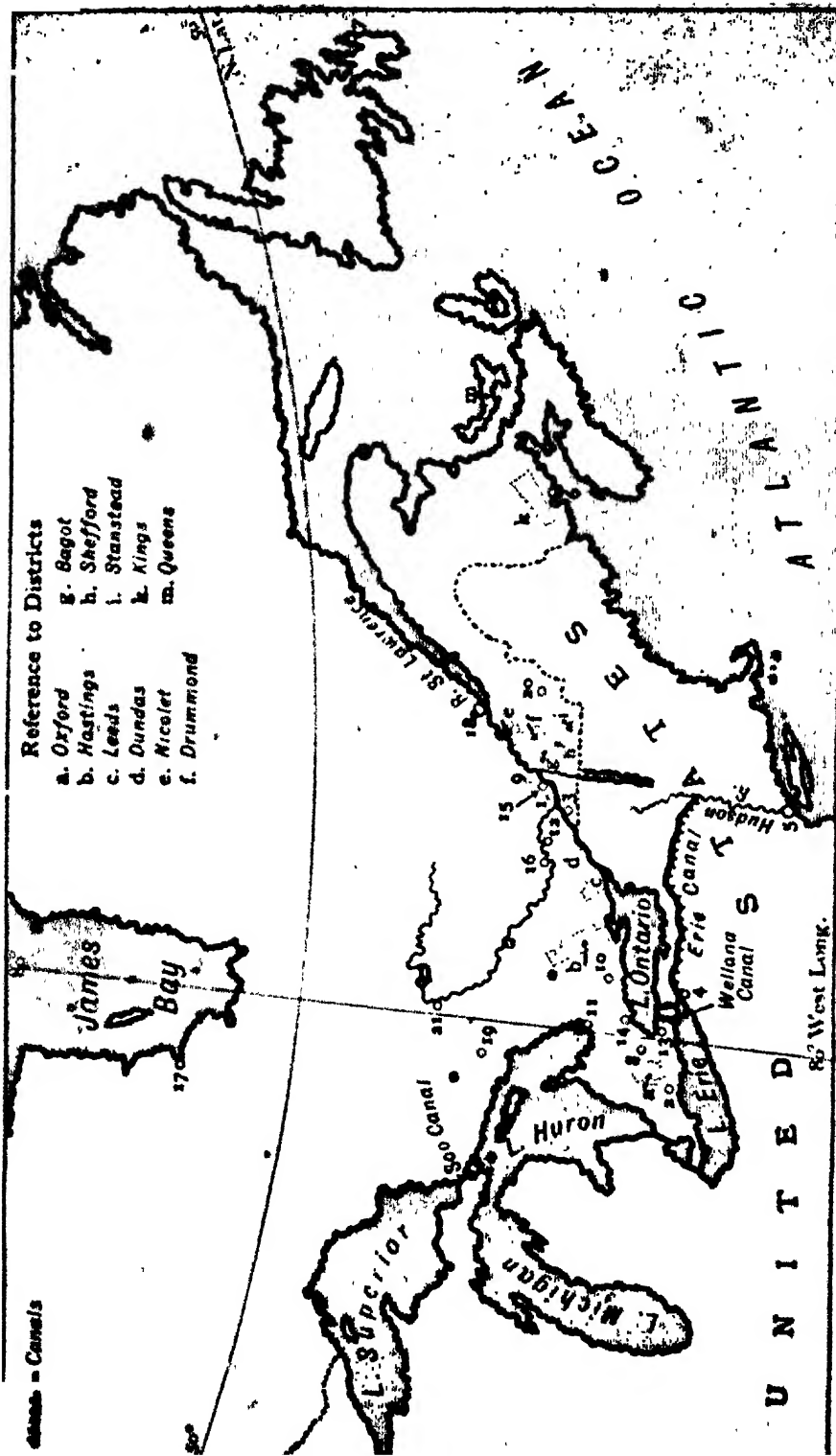


FIG. 77.—EASTERN CANADA: DAIRYING DISTRICTS, ETC.

- | | | | | | |
|---------------------|----------------|-------------------|---------------|-------------|--------------|
| 1. Ste. Catharines. | 7. St. John's. | 10. Peterborough. | 13. Hamilton. | 16. Hull. | 19. Sudbury. |
| 2. St. Thomas. | 8. Guelph. | 11. Milland. | 14. Toronto. | 17. Albany. | 20. Lambton. |
| 3. Valleyfield. | 9. Mile End. | 12. Cumberland. | 15. Montreal. | 18. Quebec. | 21. Colsalt. |

As regards wheat, Canada sends to the United Kingdom nearly all her exports of this cereal (six-sevenths), but the total quantity is only about two-thirds of that sent from India, and is not quite double that sent by Australia (p. 88). Canada, however, is the main British source of the oats which are sent to the United Kingdom from the various parts of the Empire; she sends four-fifths of her total export of this food-stuff.

Within the Empire, Canada supplies the Mother Country with food-stuffs in greater quantity than any other part in the case of oats and cheese; the supply of meat from Canada is equalled by that from New Zealand; the supply of wheat is exceeded by that of India.

SUMMARY.

1. Canada exceeds Australia slightly in area and population.
2. Quebec and Ontario have the larger populations, and rear the majority of the domestic animals.
3. Canada has mountains in the west, lowlands in the middle and uplands in the east.
4. The St. Lawrence, with the Great Lakes, is the most important waterway.
5. Populated Canada has warm summers and cold winters.
6. The western coast of Canada is warmer in winter than the eastern coast latitude for latitude.
7. Canada produces wheat, oats and barley: the wheat and oats are exported largely to the Mother Country.
8. Canada rears cattle and pigs, and supplies meat and cheese to the Mother Country.
9. India sends more wheat to the Mother Country than Canada, New Zealand as much meat, Australia and New Zealand more wool.
10. Manitoba, Saskatchewan, Ontario are arable farmers' lands.

QUESTIONS.

1. Write an account of Canada, with special reference to (a) climate, (b) mountain system, (c) river system. (N.Z. Ed.D.)
2. Describe the climate of Canada (i) in its eastern parts, (ii) in its central parts, (iii) west of the Rocky Mountains. (Ont.)

3. On which colony is England most dependent for supplies? Illustrate your answer by statistics. (L.C. Com.)

4. Describe, with a sketch map, the great lakes that separate Canada from the United States of America. Give the character and the productions of the country bordering the lakes on each side. (C.P.)

5. Contrast and account for the climates of British Columbia and Labrador, and indicate the resultant effect on the development of each district. (L.C. Com.)

46. Canada. Minerals, Communications, etc.

1. Mark on an outline map the mining districts named in the tables, pp. 247-8.

2. Mark on an outline map the towns named in the list, p. 249, and show the trans-continental railway lines made and projected.

3. Draw a sketch map of the St. Lawrence river and the Great Lakes to show the traffic routes. Mark on the map particulars of the articles carried and the ships which carry them.

Forests.—North of the populated region (p. 243) there is the area of the temperate forest, where the trees are felled in winter, transported by means of the snow to the streams, and by the streams after the thaw to the main saw mills. The forest produce is largely timber, wood pulp, wood tar and turpentine.

Quebec and British Columbia are the most densely forested provinces.

CANADIAN MINERAL PRODUCTION.

PROVINCE.	Coal in million tons.	Iron Ore in thousand tons.	Gold in million £.	Silver in million oz.	Chief Mining Districts.
Nova Scotia	6	181	0.1	—	Cumberland
Ontario	—	315	—	6	Cobalt
Br. Columbia	2	10	1.1	3	(Kootenay (Nanaimo
Quebec	—	17	—	—	—
Alberta	1	—	—	—	—
Yukon	—	—	1.6	—	Klondike
Total	9	360	2.8	9	

Minerals.—Canada produces about as much coal as Australia, mainly in Nova Scotia and British Columbia. Iron ore is mined and worked into pig iron and steel largely in Ontario; the chief steel works are at **Badnor, Midland, and "Soo."**

Gold is mined in British Columbia and in the Yukon district to provide about $\frac{1}{3}$ of the world's production. Silver, lead, copper, nickel are mined largely in Ontario at **Cobalt** and **Sudbury**.

Petroleum is obtained in Ontario, and asbestos is mined near the Ottawa river.

OTHER MINERALS AND MINERAL PRODUCTS.

		Chief District.
Lead (million lbs.)	49	
Copper (million lbs.)	59	Sudbury (Ontario)
Nickel (million lbs.)	20	Sudbury (Ontario)
Petroleum (million gallons)	23	Lambton County (Ontario)
Pig iron (thousand tons)	607	Sydney, Hamilton, Radnor, Midland, Sault Ste Marie
Steel and steel goods (thousand tons)	683	

Canada is like Australia in regard to the fact that the gold discoveries in the west at British Columbia and Western Australia respectively have been responsible for the population of those areas; British Columbia has not the drawback of an insufficient rainfall, and has the advantage of extensive coal supplies and fisheries.

CANADIAN FISHERIES.

	Value in million £.	Chief Kinds.
British Columbia	1.2	Salmon, halibut
New Brunswick	0.9	Herring, cod, lobster, sardines
Manitoba, Alberta,) Saskatchewan)	0.3	White-fish
Nova Scotia	1.5	Cod, lobster
Ontario	0.3	Trout
Prince Edward Island	0.2	Lobster
Quebec	0.4	Cod, lobster, salmon
Total	4.8	Cod, herring, lobsters, salmon

Fisheries.—The shoals which are known as the Banks of Newfoundland are famous fishing ground for cod; and, therefore, Quebec, New Brunswick and Nova Scotia have important cod fisheries (Fig. 78). The rivers of the West Coast are notable for salmon,

especially the Fraser, and the British Columbia salmon fisheries account for one-quarter of the value of Canadian fisheries. In the many rivers and lakes, fish are numerous ; and therefore even the inland provinces have a small fishing industry, chiefly in trout and white-fish.

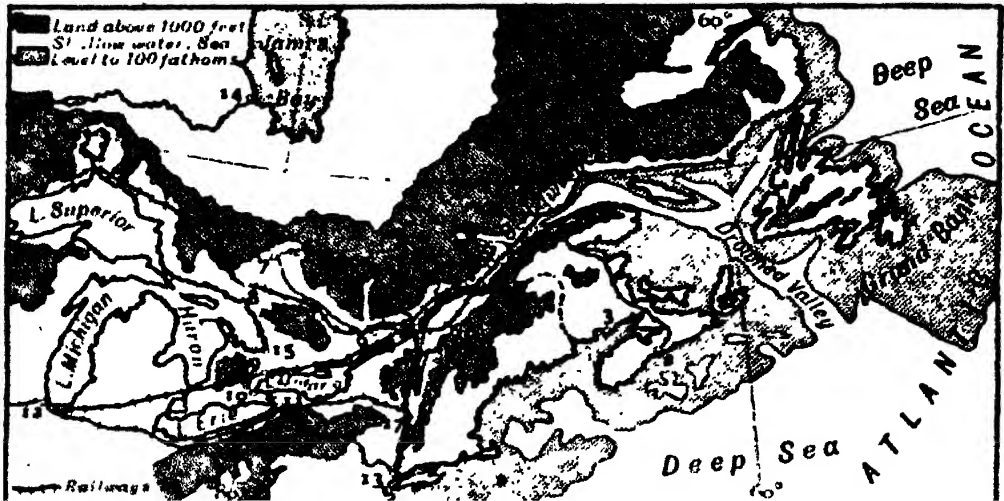


FIG. 72.—EASTERN CANADA.

- | | | | |
|----------------|-------------|---------------|------------------|
| 1. St. John's. | 6. Ottawa. | 10. Hamilton. | 14. Fort Albany. |
| 2. Halifax. | 7. Cobalt. | 11. Buffalo. | 15. Midland. |
| 3. St. John. | 8. Sudbury. | 12. Chicago. | 16. Sherbrooke. |
| 4. Quebec. | 9. Toronto. | 13. New York. | 17. Albany. |
| 5. Montreal. | | | |

TOWNS AND POPULATION.

- (i) Montreal (450,000), Toronto (325,000).
- (ii) Winnipeg (125,000), Vancouver (85,000), Ottawa (83,000), Quebec (75,000), Hamilton (70,000), Halifax (50,000), St. John, N.B. (50,000), London (50,000), Calgary (42,000), Victoria (40,000), Edmonton (25,000).
- (iii) Kingston (20,000), Brantford (20,000), Hull (15,000), Charlottetown (12,000), Windsor (16,000), Sherbrooke (16,000), Guelph (15,000), Peterborough (17,000), St. Thomas (15,000), Fort William (18,000), Regina (15,000), Stratford (15,000), Montcalm (12,000).

Towns.—Canada is like Australia in the small number of towns with a population of more than 10,000 people ; but is not like

Australia in that there are no large cities like Sydney and Melbourne.

The towns named in the above list are shown on the maps (Figs. 78-9), and will be seen to lie on or near the great lines of communication by rail and river from east to west.

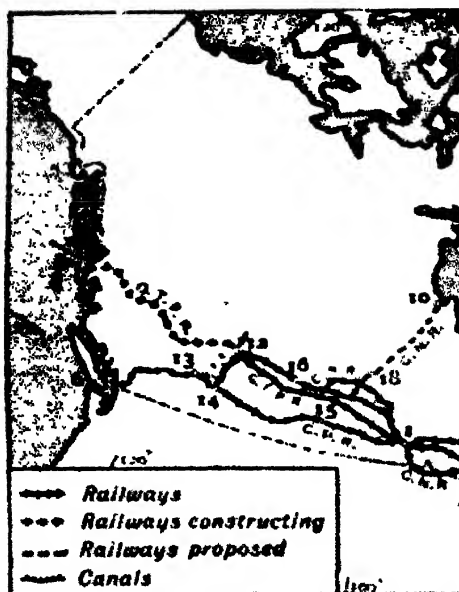


FIG. 79.—CANADA: RAILWAYS.

C.P.R.—Canadian Pacific Ry.

G.T.R.—Grand Trunk Ry.

G.T.P.R.—Grand Trunk Pacific Ry.

C.N.R.—Canadian Northern Ry.

- | | | |
|--------------|---------------------|-----------------|
| 1. Winnipeg. | 7. St. Henri. | 13. Banff. |
| 2. Ottawa. | 8. Grantford. | 14. Calgary. |
| 3. Quebec. | 9. Charlottetown. | 15. Regina. |
| 4. Montreal. | 10. Fort Churchill. | 16. Battleford. |
| 5. St. John. | 11. Sherbrooke. | 17. Halifax. |
| 6. Victoria. | 12. Edmonton. | 18. Le Pas. |

Communications.—Owing to its great extent in an east and west direction, and to the fact that the forest belt reaches close to the St. Lawrence river, the main development of railways in Canada has been in making a trans-continental line, the **Canadian Pacific Railway**. At the present time this line is proving insufficient for the development of the country west of Lake Superior, so that other trans-continental lines are being made, the **Grand Trunk Pacific** and the **Canadian Northern**. These lines of communication are shown on the map (Fig. 79).

CANADIAN CANAL TRAFFIC: TONNAGE.

VESSELS.	PERCENTAGES.								Total Tonnage in 1000 tons.	
	From Can. to Can. Ports.		From Can. to U.S. Ports.		From U.S. to U.S. Ports.		From U.S. to Can. Ports.			
	W.	E.	W.	E.	W.	E.	W.	E.	W.	E.
Canadian	80	81	11	6	1	1	8	12	2853	2844
U.S.	1	4	10	2	85	84	4	13	3374	3502

W. = Westward traffic. E. = Eastward traffic.

In addition to the railway traffic there is the river and lake traffic. From Lake Superior to Lake Huron there are the **Soo** (Sault Ste Marie) Canals; to avoid the Niagara Falls there is the **Welland Canal**. These are shown on Fig. 77. By means of these canals there is a large traffic between Canadian and United States ports in vessels belonging to both nations. The total tonnage engaged in this traffic is about six million tons, which is one-third of the tonnage which passes annually through the Suez Canal (p. 148). The Canadian ships are mostly used for the traffic between Canadian ports, and the United States ships are mostly used for traffic between ports of their own nation.

CANADIAN CANAL TRAFFIC: GOODS.

	PERCENTAGES.		Total.
	"Soo" Canal.	Other Canals.	
Forest produce . . .	—	10	10
Farm „	13	11	24
Manufactures	1	3	4
Miscellaneous goods .	53	9	62
Total	67	33	100

Two-thirds of the total Canal traffic passes through the "Soo" Canal, and one-quarter consists of farm produce, mostly grain. The eastern canals are used for timber, etc., as much as for farm produce.

Trade.—Canada supplies food-stuffs largely to the United Kingdom; timber, wool and minerals mainly to the United States.

Canada sends very little of her produce to other countries than the United Kingdom and the United States, and, with the exception of tea and coffee, receives very little from any other countries.

CANADIAN IMPORTS.

ARTICLE.	Total.	PERCENTAGE FROM	
		United Kingdom.	United States.
Rice - - - million lbs.	34	27	—
Maize - - - „ bush.	12	—	100
Tobacco - - - „ lbs.	15	—	100
Wool - - - „ „	6.5	51	21
Pork - - - „ „	15	—	100
Coffee - - - „ „	7	—	—
Tea - - - „ „	30	20	—
Coal - - - „ tons.	7	—	100
Petroleum - - „ galls.	10	—	100
Raw cotton - - „ lbs.	61	—	100
Cotton goods - - „ £	2	75	20
Woollen „ - - „ „	3.6	83	—
Flax „ - - „ „	0.6	83	—
Iron and steel goods „ „	10	20	70
Silk goods - - „ „	0.8	50	—

Canada imports food-stuffs, such as rice, which she cannot grow ; raw materials, such as cotton, which she cannot produce, and such as wool and coal, of which her production is less than her needs ; and manufactured goods of all kinds, of which the textiles are from the United Kingdom and the iron and steel goods from the United States.

Oceanic communications.—For this trade Canada depends on the rail and river traffic to the United States (Fig. 78) and on the ocean routes to the United Kingdom.

Oceanic navigation terminates during the winter months at Halifax, and during the summer months at Montreal, which cannot be reached in winter owing to the ice of the St. Lawrence.

Much of the traffic which centres on Montreal is grain traffic, and consequently during the period between the harvest and the beginning of the ice there is a great rush of traffic eastwards. The “Soo” Canal is closed by ice for about one-third of the year.

CANADIAN EXPORTS.

ARTICLE.	Total.	PERCENTAGE TO	
		United Kingdom.	United States.
Wheat . . . million bush.	42	86	—
Oats . . . " "	5	80	—
Cattle . . . thousands	173	92	5
Bacon . . . million lbs.	106	100	—
Wool . . . " "	17	19	81
Timber . . . " £	8	38	50
Herring . . . million lbs.	20	—	90
Lobster . . . " "	10	30	30
Salmon . . . " "	26	69	4
Butter . . . " "	24	96	—
Cheese . . . " "	190	94	—
Coal . . . " tons	16	—	80
Asbestos . . . thousand "	59	9	82
Copper . . . million lbs.	43	5	95
Nickel . . . " "	18	11	89
Lead . . . " "	25	—	64
Iron ore . . . thousand tons	134	—	100

In order to relieve the resulting congestion, it is suggested that a railway be built to Hudson Bay, as shown in Fig. 79, and that ships for the United Kingdom should sail thence instead of from Montreal. If a globe be examined it will be found that **Montreal** and **Port Churchill** are both about the same distance from the British Isles.

CANADIAN PORTS: OCEAN-GOING SHIPS.

	Montreal.	Quebec.	St. John, N. B.	Halifax.	Vancouver.	Victoria.
Number of vessels . . .	359	168	1169	973	967	1023
Tonnage in thousand tons . .	1198	508	687	855	741	1030
Average tonnage . . .	3300	3000	600	880	760	1000

Montreal and Quebec are the most important Canadian ports: they are used by the largest ships. The smaller ships which frequent the other ports are mainly engaged in carrying goods along the coast.

SUMMARY.

1. Canada contains large forest areas with trees suitable for timber and wood pulp.
2. Canada produces coal, iron ore, copper, lead, nickel, silver, petroleum.
3. Canada has extensive fisheries.
4. Railway communication in Canada is from east to west, and is trans-continental.
5. The difficulties of the St. Lawrence navigation are overcome by canals.
6. Canada trades chiefly with the United Kingdom and the United States.
7. Pressure of the grain traffic from the wheat lands may cause Hudson Bay to be used for steamship traffic.

QUESTIONS.

1. Contrast Canada and New Zealand as outlets for the British emigrant: write under the following heads: Scope, climate, resources.
(N.Z. Ed. D.)
2. Draw a map of that part of Canada which is situated outside the Arctic Circle, and indicate thereon the principal features and towns.
(U.A.)
3. Compare the trade passing through the "Soo" Canal (Saulte Ste Marie, Lake Superior) with that of the Suez Canal as regards its nature, amount, and destination.
(U.S.)
4. Describe the principal products of Canada and the trade routes from Canada to London and Melbourne respectively.
(U.M.)
5. Describe briefly the St. Lawrence river basin. Point out the chief advantages which Canada derives from the use of the St. Lawrence river and the lakes as a commercial highway.
(Ont.)
6. Point out the advantages of the St. Lawrence (a) for the transportation of the natural products, (b) for the transportation of the necessary imports, (c) for tourist travel, (d) for the production of water power.
(Ont.)
7. Contrast Canada and Australia as fields for emigration.
(Sc. Ed. Dent.)

8. Discuss the value of the Canadian Pacific Railway as a link between (a) Eastern and Western Canada, (b) the different parts of the British Empire. (C.P.)

9. Give an account of the productions and commerce of Canada, naming the chief ports. (L.C.C.)

10. Compare the "Soo" and Suez Canals with respect to position, size and extent of traffic. (L.C. Com.)

11. Consider the extent to which Canada is available for the growth of wheat, and describe the water route for the transport of grain from Central Canada to England. (L.C. Com.)

47. Other British Possessions.

1. Tabulate the climatic and other facts regarding Newfoundland and the British West Indies.

2. Make a tracing of the outline of the land from the map (Fig. 69). On the tracing make two circles, with centre at Bermuda, 800 and 1100 miles respectively in radius. What do you notice about the position of Bermuda?

3. Revise the facts given in Chapter 14 on sugar production, and in Chapter 5 on tropical forests.

	Area in thousand sq. miles.	Population in thousands	Animals in thousands.	
			Cattle.	Sheep.
Newfoundland	43	230	33	78
Labrador	120	4		
Jamaica	4	834	109	16
Bahamas	4	60	—	—
Other British West Indies	3	842	—	—
Bermuda	—	19	—	—
British Honduras	8	42	—	—
British Guiana	91	298	78	20
Falkland Islands	7	2	5	700

Size, position, etc.—The Colony of Newfoundland includes Labrador, and lies off the east of British North America. The island of Newfoundland is about two-fifths the size of New Zealand and about twice that of Ceylon. The population of Newfoundland is a little more than half as dense as that of New Zealand.

Bermuda is a coral island, with numerous islets, lying off the coast of the United States; it lies about 800 miles from any port on the eastern coast of the United States.

The **British West Indies** form a large portion of the West Indian Archipelago: **Jamaica** is the largest island, and has a dense population, about 200 to the square mile, of which a large proportion are negroes or of negro descent.

British Honduras is a small colony in Central America, and **British Guiana** a larger colony—twice the size of Newfoundland, three-quarters that of the United Kingdom—on the north shore of South America.

The **Falkland Islands** form an archipelago in the South Atlantic Ocean about as large as British Honduras.

Climate, etc.—Labrador is tundra. Newfoundland is colder than Nova Scotia. The West Indies, British Honduras and British Guiana are tropical, and contain tropical forest trees, from which mahogany and logwood are produced. The Falkland Islands have a rainfall of about 30 inches per annum and frequent mists with a cold climate.

The domestic animals of these possessions are few in number, except in the case of the Falkland Islands, where there are many sheep. Guiana and the British West Indies have, however, extensive pasture lands, which could carry more cattle than are reared there at present.

NEWFOUNDLAND FISH EXPORTS.

Kind.	Value in £1000s.	Percentages to :
Cod	1571	Portugal (23), Spain (13), Italy (16), Brazil (25)
Herring	77	Canada (22), U.S.A. (22)
Salmon	17	United Kingdom (38), Canada (44), Br. W. Indies (6)
Lobster	78	United Kingdom (32), Canada (13), Germany (41)
Fish oil	186	United Kingdom (64), Canada (5), U.S.A. (20)

Newfoundland fisheries.—The Grand Banks of Newfoundland are notable as one of the two sea areas which have extensive fisheries. The harvest of the sea is so plentiful that fishing fleets are attracted from Canada, the United States and Western Europe. The people of Newfoundland have the advantage of proximity, and nearly all are interested in the fishing industry. The total export of this work is valued at about £2,000,000 per annum; the main product is cod, which is sent to the countries of Portugal, Spain, Italy and Brazil, which require fish for food owing to their adherence to the precepts of the Church of Rome.

The **herring** trade is local, while the produce of the **salmon** and **lobster** fisheries, as well as the **fish oil**, is largely sent to the United Kingdom.

PRODUCTION OF CANE SUGAR IN 1,000,000 CWTs.

World.		British Empire		British America.	
U.S. Empire	22	India	41.1	Trinidad	1.0
Cuba	24	Australia	3.9	Barbados	1.0
Java	22	Natal	0.4	Jamaica	0.5
Other Foreign Countries	18	Mauritius	3.5	Rest of W. Indies	0.8
British Empire	55	Egypt	1.0	Br. Guiana	2.2
		Br. America	5.5		
Total	141	Total	55.4	Total	5.5

Cane sugar.—The British Empire produces about one-third of the world's production of cane sugar, and about one-tenth of this is produced in British America. British Guiana, Trinidad and Barbados are the chief growers. (Chapter 14)

Some of this sugar is sent to the United Kingdom and to Canada, but a large portion of it is sent to the United States, and is returned thence to the West Indies as refined sugar.

EXPORTS OF DOMESTIC PRODUCE (PERCENTAGES).

Bahamas	Hemp (<i>U.S.A.</i> 97), fruit (<i>U.S.A.</i> 93), sponge (<i>U.S.A.</i> 55).
Jamaica	Cocoa (<i>U.K.</i> 47), coconut (<i>U.S.A.</i> 74), bananas (<i>U.S.A.</i> 88), other fruit (<i>U.S.A.</i> 50), logwood (<i>U.S.A.</i> 39, <i>U.K.</i> 18), raw sugar (<i>Canada</i> 70, <i>U.K.</i> 23).
Barbados	Raw sugar (<i>Canada</i> 40, <i>U.K.</i> 28, <i>U.S.A.</i> 32).
Trinidad	Asphalt (<i>U.S.A.</i> 59, <i>U.K.</i> 15), cocoa (<i>U.S.A.</i> 50), coconuts, etc. (<i>U.S.A.</i> 90), raw sugar (<i>U.K.</i> 52, <i>Canada</i> 45).
Leeward Is.	Cocoa (<i>U.K.</i> 90), limes (<i>U.K.</i> 70), raw sugar (<i>Canada</i> 80).
Bermuda	Onions (<i>U.S.A.</i> 98), potatoes (<i>U.S.A.</i> 90).
Br. Honduras	Mahogany (<i>U.K.</i> 69), logwood (<i>U.K.</i> 93), cedar (<i>U.K.</i> 60), rubber (<i>U.S.A.</i> 100), coconuts (<i>U.S.A.</i> 100).
Br. Guiana	Rice (<i>Br. W. Indies</i> 93), gold (<i>U.K.</i> 92).

Other products.—Cocoa is sent to the United Kingdom and France from Jamaica, Trinidad and the Leeward Islands.

Coconuts and copra are sent to the United States from Jamaica, Trinidad and British Honduras.

Fruits are grown in the Bahamas, Jamaica, and the Leeward Islands, and are mainly sent to the United States, especially the **bananas** of Jamaica.

Tropical forest products - mahogany, logwood, cedar - are sent to the United Kingdom from British Honduras, as well as logwood from Jamaica.

British Guiana grows **rice** and mines **gold**. The rice forms part of the large supplies of this food-stuff which are required by the West Indies.

Bermuda supplies early vegetables to the United States.

TRADE.

	PERCENTAGE Imports from			Total Imports £1,000,000	PERCENTAGE Exports to			Total Exports £1,000,000
	United Kingdom	Canada	United States		United Kingdom	Canada	United States	
Newfoundland	25	35	34	2.2	12	14	11	2.4
Jamaica	49	7	41	2.4	22	7	57	2.0
Barbados	42	8	34	1.2	23	40	23	0.6
Trinidad	36	6	27	2.4	25	12	31	2.0
Other Br. W. Indies	35	11	45	1.4	38	20	36	1.1
Bermuda	30	15	51	0.4	2	1	95	0.1
British Honduras	27	—	53	0.4	42	—	57	0.2
British Guiana	55	7	30	1.7	43	40	15	1.7

Trade.—The smaller parts of British America illustrate by their trade two controlling factors. In the case of the trade with the United States there is the factor of **nearness**: although, as shown in Chapter 49, most of the trade is with New York, which is *not* the nearest United States port. In the case of the United Kingdom the factor is that which unites the Empire.

Most of the exports for food go to the United States, and most of those which are raw materials go to the United Kingdom.

Most of the food-stuffs imported are supplied by the United States and most of the manufactured goods--cottons, silks, iron and steel goods--are sent from the United Kingdom.

The United Kingdom supplies **rice** and **tea**; which exemplifies the **entrepôt** trade of the Mother Country.

In connection with the supplies of meat, butter and cheese there are two possibilities to be noted. The first is that Canada may increase her proportion of supplies ; the second is that the herds of cattle in Jamaica and British Guiana may be increased and thus supply the needs of these colonies. *

CHIEF ARTICLES IMPORTED.

To	United Kingdom	SUPPLIES FROM	
		Canada	United States
Newfoundland	Tea (31), apparel (77), textiles (72)	Butter (47), cheese (97), cereals (75), tea (26)	Meat (84), petroleum (90), sugar (74)
Bahamas	Rice (86), sugar (44), textiles (54)		Butter (93), cheese (93), meat (99), sugar (25), textiles (45)
Jamaica	Apparel (85), butter (35), textiles (76), rice (71), iron goods (60)	Butter (15), fish (73)	Meat (81), butter (49), cheese (73)
Barbados	Butter (48), textiles (96), rice (40), iron goods (75)	Fish (50)	Butter (52), flour (90), sugar (97)
Trinidad	Rice (25), iron goods (60), textiles (75)	Fish (74)	Cheese (76), meat (92)
Rest of Br. W. Indies	Textiles (85), rice (69), iron goods (75)	Butter (14), cheese (75)	Meat (89), butter (53)
Bermuda	Textiles (67)	Butter (67), cheese (100)	Meat (100), provisions (80)
Br. Honduras	Apparel (52), textiles (45), hardware (38)		Meat (100), butter (83), cheese (67), textiles (49), hardware (62)
Br. Guiana	Iron goods (80), textiles (87)	Fish (80)	Meat (96), cereals (80)

(The numbers) are percentage of total supplied to each country.

In the case of sugar, it is possible that the raw sugar might be refined on the spot and thus change the value of both imports and exports of this commodity.

SUMMARY.

1. Newfoundland has famous fisheries.
2. Bermuda is a coral formation and supplies the United States with early vegetables.

3. The British West Indies supply tropical products—cane sugar, bananas, cocoa, coconuts, copra, logwood.

4. British Honduras supplies mahogany, logwood and cedar.

5. British Guiana supplies rice and gold.

6. The Falkland Islands rear sheep and supply wool to the United Kingdom.

7. The United States and United Kingdom compete for the trade of these lands.

8. The United States gain by reason of their nearness and trade in food-stuffs.

9. The United Kingdom gains by reason of the Imperial tradition and trades in raw materials and manufactures.

48. The United States.

1. Record the climatic and other facts regarding this area.

2. Find the distances from New York to San Francisco, New Orleans and Montreal respectively.

3. Record the production of the United States as percentages of the world production of cereals (p. 60), animals (p. 70), wool (p. 44), cane sugar, cotton and tobacco (pp. 55-6), coal and iron (p. 62).

Position. - The United States extend from lat. 49' N. in the west and the Great Lakes in the east to the Gulf of Mexico, and from the Atlantic to the Pacific Ocean.

Size and population. - The United States are almost as large as Canada, larger than Australia, and have a population twice that of the British Isles (p. 289). They contain the most densely populated parts of America.

Relief.—Westwards from the **Atlantic** the land rises to the **Appalachians**, then falls to the **Mississippi**, and rises again to the **Rocky Mountains**. From the Rockies to the **Pacific**, ranges of mountains and valleys alternate.

The Appalachians form a barrier to communication from the coast westwards: this barrier is highest in the south (Figs. 81 and 82).

The map (Fig. 80) shows the points where the navigable rivers end; the spaces without navigable rivers are the uplands and mountains. The Atlantic rivers are navigable to the "fall line," which is just about 100 feet above sea level.

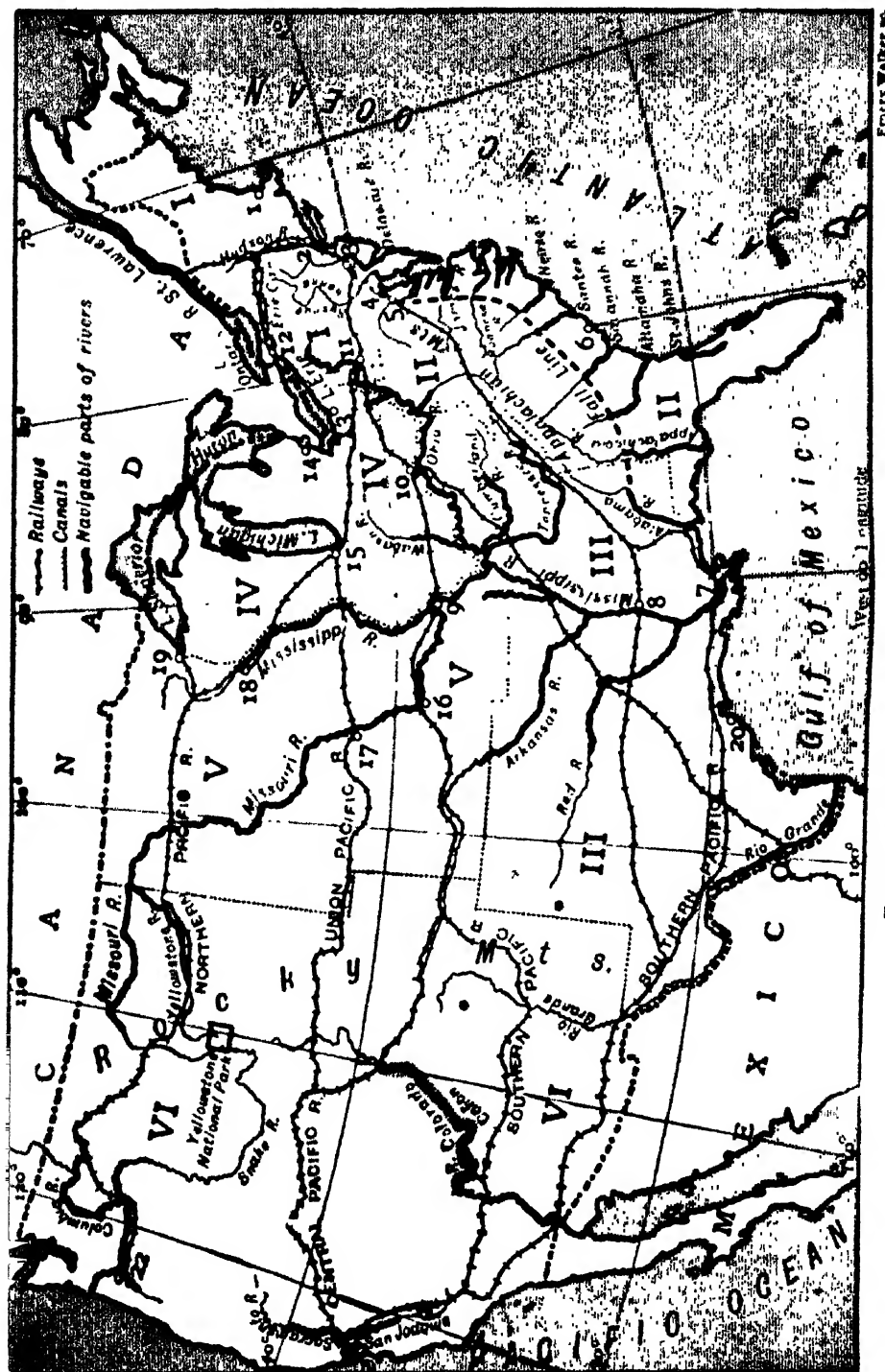


FIG. 86.—UNITED STATES: COMMUNICATIONS.

1. Boston.
2. New York.
3. Philadelphia.
4. Washington.
5. Vicksburg.
6. Charleston.
7. New Orleans.
8. St. Louis.
9. Cincinnati.
10. Cleveland.
11. Pittsburgh.
12. Buffalo.
13. Chicago.
14. Detroit.
15. Minneapolis.
16. Duluth.
17. Omaha.
18. Galveston.
19. San Francisco.
20. Portland (Oregon).

The lowland of the Mississippi Valley extends eastward in the Ohio Valley and westward in the Missouri Valley.

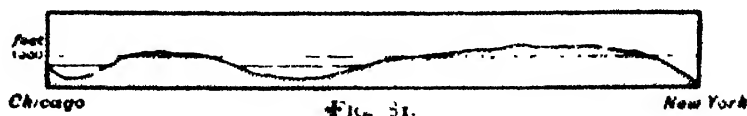


FIG. 81.

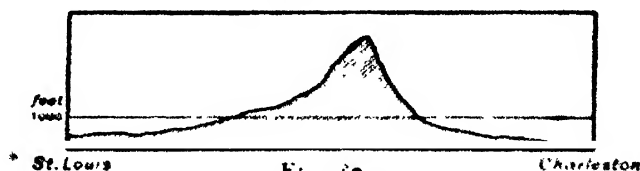


FIG. 82.

FIGS. 81 AND 82.—SECTIONS ACROSS THE APPALACHIANS.

The western mountains—the coast ranges—run north and south and enclose valleys which lie in the same direction. Only the

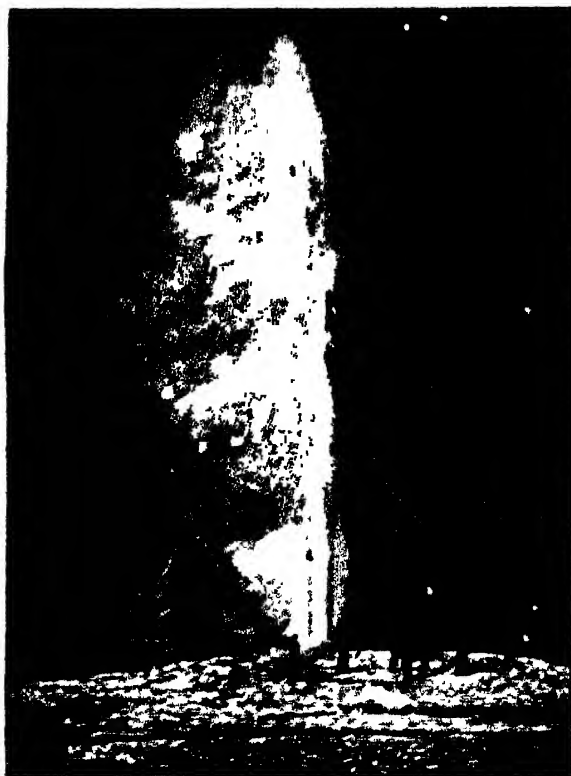


FIG. 83.—GEYSER IN YELLOWSTONE PARK.

Columbia river breaks through the ridge and is navigable for some distance eastwards from the Pacific.

On the east side of the Rocky Mountains there is a great national reservation, Yellowstone Park, in which the natural

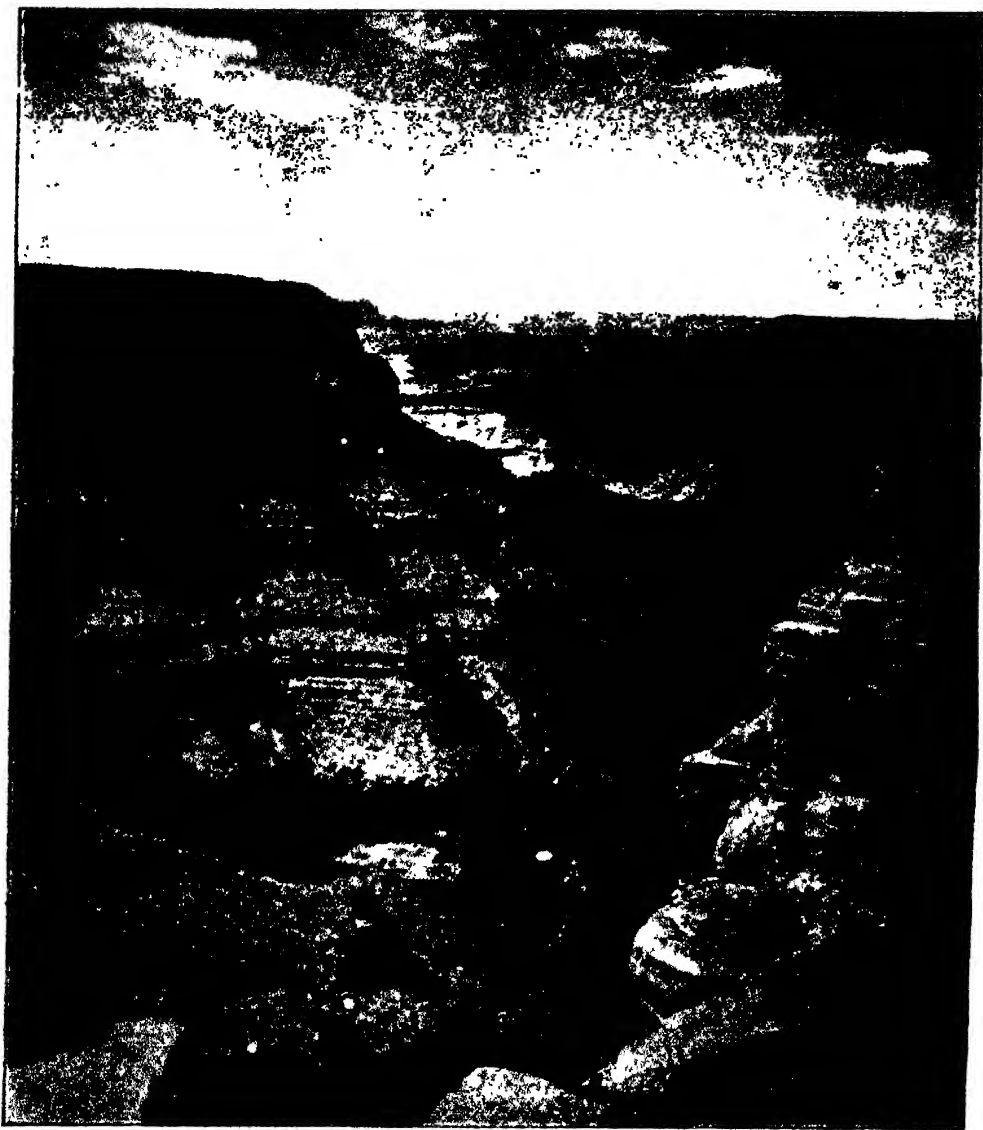


FIG. 84. —THE COLORADO CAÑON.

beauties of the land are preserved. Here are evidences of volcanic activity, among which the chief are the geysers (Fig. 83).

Climate and vegetation.—The main facts about the climatic and vegetation regions have been described in Chapter 44. On the

east side of the Rockies the foehn effect (p. 30), which is locally called the *chinook*, is felt on the upland plateaus. The arid conditions of the South-Western United States are well shown by the fact that the rivers cut deep gorges, the sides of which are not worn down by rain. The best example of this is the cañon of the Colorado River (Fig. 84).

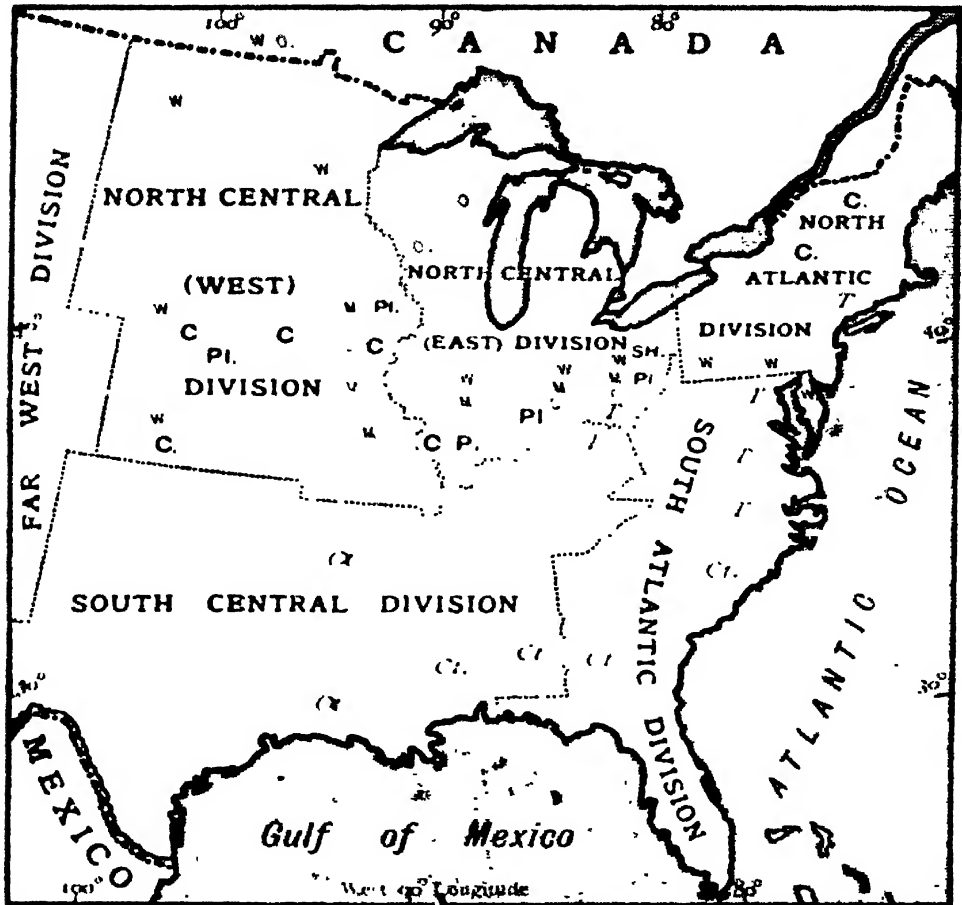
Productions.—Many isolated facts have been given about the United States in Part I: they are here repeated with additions.

UNITED STATES PRODUCTIONS

	Total	Percentage of World Production	Chief States *
	in millions of bushels		
Wheat	672	29	Kansas, Minnesota, North Dakota, Nebraska, Indiana, Ohio.
Oats	800	25	Iowa, Illinois, Wisconsin, Minnesota.
Barley	100	13	Minnesota, Wisconsin, South Dakota, California.
Rye	30	2	Pennsylvania, Michigan, Wisconsin.
Maize	2004	77	Illinois, Iowa, Missouri, Nebraska, Kansas, Indiana, Ohio.
	in millions		
Horses	21	25	Illinois, Iowa, Texas, Kansas, Nebraska.
Sheep	56	10	Montana, Wyoming, New Mexico, Idaho, Utah, Ohio.
Pigs	56	40	Iowa, Illinois, Nebraska, Ohio.
Cattle	71	17	Kansas, Iowa, Illinois, Missouri, Nebraska.
	in million lbs.		
Wool	271		Wyoming, Montana, New Mexico, Idaho, Utah.
Tobacco	717		Kentucky, North Carolina, Virginia.
	in million tons		
Sugar	11	8	Louisiana.
Cotton	26	62	South Carolina, Mississippi, Georgia, Alabama.
Coal	400		Pennsylvania, West Virginia, Ohio, Illinois.
Iron ore	44		Minnesota, Michigan.
Pig iron	21		Pennsylvania, Ohio.
Steel	19		Pennsylvania, Ohio.

* For the position of these States consult the Wall Map.

This table shows that the coal and iron trade is localised in and near the Ohio Valley. Cotton is grown in the south—the **cotton belt**; tobacco rather further north—the **tobacco belt**; and cereals further north (Fig. 85).



W = Wheat, M = Maize, O = Oats, C = Cotton, T = Tobacco, SH = Sheep, C = Cattle, Pl. = Pigs.

These letters indicate the districts where production is greatest in proportion to area.

FIG. 85.—FARMING IN THE UNITED STATES.

Sheep are reared on the eastern slopes of the Rocky Mountains, away from the other animals.

Horses, cattle and pigs occur where maize is grown. Wheat is largely grown in the states west of Lake Michigan.

UNITED STATES PRODUCE, ETC.

DIVISION.	Million quarters.				Million tons.	Million lbs.	100,000.			Million lbs.
	Maize.	Wheat.	Oats.	Barley.	Cotton.	Tobacco.	Horses.	Cattle.	Sheep.	Wool.
North Atlantic	12	5	9			70	19	67	30	14
South ..	31	5	2		12	305	12	49	21	8
North Central (East)	85	16	35	5		84	48	114	83	37
.. .. (West)	120	41	41	12		2	66	223	43	23
South ..	84	6	0		14	250	35	154	39	15
Far West	1	11	7	5			27	105	345	174
Total	333	84	100	20	26	717	207	712	561	271

For farming purposes the United States may be summarised in the six divisions shown in the above table and on the map (Fig. 85). The map shows the cotton and tobacco in the south, the cereals in the north central districts with the cattle and pigs, and the sheep in Ohio. Except for the sheep in the Far West, no other part of the United States is important for agriculture.

UNITED STATES MINERAL PRODUCTS OTHER THAN COAL AND IRON.

	Total	Percentage of World Production	UNITED STATES.
	million oz. Troy		
Silver	54		Colorado, Nevada, Montana, Utah.
Gold	45	23	Colorado, California, Nevada, Alaska.
	thousand tons		
Copper	404	60	Michigan, Montana, Arizona
Lead	302	30	Missouri, Idaho.
Zinc	186	26	Missouri.
	million galls.		
Petroleum	7286	—	Oklahoma, California, Illinois.
	million lbs.		
Mercury	16	21	California, Texas.

The above table shows how important are the United States as a source of certain minerals. The output of **lead**, **copper** and **petroleum** is greater in each case than that of any other country.

49. United States: Communications, Trade.

Work out the percentages of the total trade of the United States which occur with the four divisions shown in the tables in this chapter.

UNITED STATES TRADE (FIVE PRINCIPAL COUNTRIES).

COUNTRY.	Value in £1000.	Chief Articles (Percentages).
From United Kingdom	40	Linens (10), cottons (9), tin (8), iron and iron goods (7).
To ..	113	Raw cotton (31), meat (23), cereals (10).
From Germany	27	Cotton goods (12), chemicals (12).
To ..	47	Raw cotton (47), cereals (6).
From Canada	13	Timber (34), copper (7), coal (5).
To ..	31	Coal (17), iron and steel goods (20).
From France	20	Cotton goods (11), silk goods (14), wine (5).
To ..	19	Raw cotton (46), copper (13).
From Holland	5	Tobacco (25).
To ..	18	Copper (25), cereals (14).
From World	252	
To ..	347	

Communications.—The United States has grown by successive movements of people westwards from the states in the north-east, near New York.

The migrations of population westwards passed beyond the Appalachians usually through the **Hudson Valley** to that of the **Ohio**. Some people journeyed by tortuous ways in the valleys of the Appalachians, but the journey was long and difficult. Others, fewer in number, passed westwards and northwards from the mouth of the Mississippi.

Consequently, the railway lines shown in the map (Fig. 80) have led to a concentration of communications at **New York**, and this city has grown larger than its neighbours **Boston** or **Philadelphia**.

The **Mississippi** and the **Great Lakes** form another line of communication which runs north and south, and on this line lie **Chicago** and **New Orleans** at the ends and **St. Louis** at the junction with the east and west route.

The **Ohio** valley has always been important as a route of transport, and the localisation of iron and coal industries has made this valley more important. **Pittsburg** exemplifies this importance.

By sea, communication has always been easy from the Eastern States to Europe across the Atlantic ; but from the Western States the sea journey has been round Cape Horn, and this journey is long and difficult. Hence the numerous transcontinental railway lines and the importance of the **Panama Canal**.

GULF OF MEXICO TRADE TO UNITED STATES.

COUNTRY.	Total U.S.A. Trade in £100	CHIEF ARTICLES.		U.S. Port for this Trade.
		Sent to U.S.	Sent from U.S.	
Costa Rica	12	Coffee, bananas	Cotton goods	New York ($\frac{1}{4}$), New Orleans
Guatemala	10	Coffee	Cotton goods, flour	San Francisco ($\frac{1}{2}$), New York
Honduras	8	Bananas, mahogany	" "	New Orleans ($\frac{1}{2}$), New York
Nicaragua	8	Bananas, mahogany, rubber	" "	New Orleans ($\frac{1}{2}$), New York ($\frac{1}{2}$)
Panama	24	Bananas	Timber, iron goods	New York ($\frac{1}{2}$), New Orleans
Salvador	4	Coffee	Cotton goods, flour	New York ($\frac{1}{2}$), San Francisco ($\frac{1}{2}$)
Haiti	6	Coffee, cocoa, logwood	" "	New York
San Domingo	12	Sugar, cocoa	" "	"
Cuba	256	Sugar, tobacco	Meat, cereals, cotton goods	New York ($\frac{1}{2}$), New Orleans ($\frac{1}{2}$)
Mexico	208	Copper, lead	Coal, iron goods	New York ($\frac{1}{2}$), New Orleans ($\frac{1}{2}$)
West Indies :				
British	40	Cocoa, bananas	Flour	New York ($\frac{1}{2}$)
Danish	2	Sugar	"	"
Dutch	2	—	" cotton goods	"
French	4	—	" timber	"
Guiana—				
British	6	Sugar	" meat	"
Dutch	2	Sugar, cocoa	"	"
Colombia	22	Coffee	" cotton goods	" ($\frac{1}{2}$)
Venezuela	20	"	Cotton goods	" ($\frac{1}{2}$)

Trade.—The productions of the United States are almost sufficient in quantity and kind for the needs of the people ; yet there is a considerable import trade and a much larger export trade. The **United Kingdom** is the most important trader (p. 267).

The countries of Western Europe supply cotton and linen goods, while the United Kingdom supplies iron and iron goods. Germany supplies chemicals, France supplies silk goods and wine, and Holland sends tobacco.

Canada, as the nearest neighbour, supplies timber and copper, and Canada is third in rank as a trader.

In exchange for these goods the United States supplies cotton and other raw materials ; also food-stuffs—both meat and cereals.

The trade of the United States with the rest of the world is best considered in three parts : with the countries on the Gulf of Mexico, those on the Pacific Ocean and those on the South Atlantic Ocean.

PACIFIC OCEAN TRADE WITH UNITED STATES.

COUNTRY.	Total U.S. A. Trade in £10's.	CHIEF ARTICLES.		U.S. Port for this Trade.
		Sent to U.S.	Sent from U.S.	
Chile	42	Nitrate	Petroleum, cotton goods	New York ($\frac{1}{2}$)
Ecuador	8	Cocoa, rubber	Flour, cotton goods	„
Peru	18	Copper	„ timber	„
Australia	78	Wool	Petroleum, iron goods	„ ($\frac{2}{3}$)
New Zealand	18	Copal	Petroleum, iron goods	„ ($\frac{2}{3}$)
Straits Settlements	34	Tin	Petroleum	„ ($\frac{2}{3}$)
East Indies :				
British	6	Plumbago	„	„
Dutch	34	Sugar, coffee	„	„ ($\frac{1}{2}$)
Hong Kong	22	—	Petroleum, flour	„ ($\frac{1}{2}$), Puget Sound ($\frac{1}{2}$)
China	122	Silk, tea, wool	Petroleum, cotton goods	New York ($\frac{2}{3}$), San Francisco ($\frac{1}{3}$)
Japan	234	Silk, tea	Petroleum, flour, cotton goods	New York ($\frac{1}{2}$), San Francisco ($\frac{1}{2}$)

From the **lands near the Gulf of Mexico** the United States obtains coffee, cocoa, sugar, tobacco, rubber and mahogany—all tropical products. In exchange the United States supply cotton goods and flour.

Mexico and Cuba are the most important of these countries: Mexico chiefly produces minerals (p. 278).

From **Pacific Ocean lands** the United States obtain nitrates, tin, silk, tea, wool, sugar, coffee in exchange for petroleum, flour, timber, cotton and iron goods.

The trade of Australia and New Zealand with the United States is small compared with that which these countries have with the United Kingdom (pp. 96, 67).

SOUTH ATLANTIC TRADE WITH UNITED STATES.

COUNTRY	Total U.S.A. Trade in £1000	CHIEF ARTICLES		U.S. Port for this Trade.
		Sent to U.S.	Sent from U.S.	
Brazil	260	Coffee, rubber	Flour, petroleum	New York (½), New Orleans
Argentina	82	Wool, hides	Timber, ..	New York (½)
Uruguay	10	Hides	Petroleum	.. (½)
British Africa				
South	24	Ostrich feathers	Petroleum, flour, meat	.. (½)
West	4		Petroleum, flour, tobacco	.. (½), Boston (¼)

The United States receives raw materials and food-stuffs from the **South Atlantic Countries** chiefly at New York, and supplies petroleum and flour to this area.

Ports.—With an extensive coast line, the United States has many ports, the most important of which are named above.

The great feature about the ports is the outstanding importance of New York.

The Atlantic and Gulf ports trade chiefly with Western Europe. The Pacific ports trade chiefly with China, Japan and the United Kingdom: while the Lake ports trade chiefly with Canada and the United Kingdom.

The articles of trade are usually food-stuffs and raw materials for manufacture.

UNITED STATES PORTS.

	PER- CENTAGES.			COUNTRIES.	ARTICLES.	
	Imports.	Exports.	Total.		Imports.	Exports.
New York	60	35	40	See below	See below	See below
Boston	9	6	7	Ger., U.K., Egypt	Coal, cotton, flax, wool	Cattle, meat
Baltimore	2	6	4	Ger., U.K.	Iron ore	Maize, tobacco
Philadelphia	5	5	5	Ger., Fr., U.K., Cuba	Copper, iron ore	Oatmeal, wheat, meat
Others	2	9	6			
Total Atlantic Ports	78	61	68			
New Orleans	3	9	7	Ger., Fr., U.K., Brazil	Coffee, bananas, sugar	Cotton, rice, timber
Galveston		10	6	Ger., Fr., U.K.		Cotton
Others	3	5	3			
Total Gulf Ports	6	24	10			
San Francisco	4	2	3	Jap., China, U.K.	Coal, iron goods, silk	Sugar
Puget Sound	1	2	2	Jap., Br. Columbia, U.K.	Copper	Wheat, copper
Others	1	1	1			
Total Pacific Ports	6	5	6			
Chicago	2		1	U.K., Ger., Fr., Canada	Tea	
Oswegatchie	2		1	Canada, Jap., China	Silk	
Buffalo	1	2	1	Canada		Coal, iron goods
Detroit	1	2	1	Canada, U.K.		Iron ore
Others	2	6	5			
Total Lake Ports	8	10	9			
St. Louis	1			Ger., U.K., Fr., India		
Others	1					
Total River Ports	2		1			

Names printed as **U.K.** show more than 33½ per cent. of total trade of port, or as **Coal** more than 33½ per cent. of total import or export of the commodity for U.S.A.

TRADE OF NEW YORK.

1. Countries (percentages).

United Kingdom (21), Canada (1), India (2), Australasia (2).
 Germany (12), France (9), Italy (5), Holland (5), Belgium (3), Spain (2).
 Cuba (6), British West Indies (1), Brazil (6), Argentina (3), Mexico (2).
 China (2), Japan (3).

2. Articles : Imports.

Over 90 % of total :	Flour (Canada), gum arabic (Egypt), cocoa (B.W.I.), figs (Turkey), almonds (Spain), tin plates (U.K.), wire rods (Sweden), tin (Sts. Settlements and U.K.), carpets (Turkey), apparel (U.K., Ger.).
67 90 . . .	Oatmeal (U.K.), macaroni (Italy), camphor (Japan), indigo (Ger.), coffee (Brazil), cotton goods (U.K., Ger.), corn (India), linen goods (U.K.), currants (Greece), lemons (Italy), rubber (Brazil), silk goods (Fr.), cane sugar (Cuba).
33 66 % . . .	Copper (Mexico), hemp (Italy), jute (India), manilla (Philippines), butter (Can., Den.), beet sugar (Ger.), tea (Japan).

3. Articles : Exports.

Over 90 % of total :	Zinc ore (Holl.)
67 90 . . .	Copper (Ger., Fr., U.K.), cotton goods (China), steel rails (Can.), beef (U.K.), refined sugar (Newfoundland).
33 66 % . . .	Smoked fish (West Ind.), petroleum (U.K., Ger., Holl.), tobacco (U.K.).

New York.—The trade of New York is about half the trade of the United States.

New York trades with the world, and imports most of the miscellaneous articles needed by the States as well as a large share of the linen, silk and iron goods imported.

New York exports zinc, copper, beef, petroleum and tobacco as raw materials, cotton goods to China, steel rails to Canada and sugar to Newfoundland.

From a first glance at the map it would be expected that most of the trade with the Gulf of Mexico would be through New Orleans, but the table (p. 268) shows that New York is more important in this trade than New Orleans.

Similarly, it would be expected that the Pacific trade would be concentrated at San Francisco, whereas New York is much more important than San Francisco.

In the same way New York is the most important port for the South Atlantic trade.

These facts make it possible to say that the hinterland of New York is almost the whole of the United States, and that this is so is due to two facts, the concentration of lines of communication on the Hudson Valley mouth and the greater density of population in the North-eastern States.

The situation of New York is not ideal for a large city ; the map (Fig. 86) shows that the city is built on a narrow island between the Hudson and East Rivers without room to expand, and therefore it has been necessary to solve the problems of how to find accommodation for the population which the enormous trade of the city has concentrated there.

New York has expanded across the East River to Brooklyn by three bridges and one under-river tube railway ; across the Harlem River to the Bronx by four bridges ; and across the Hudson River to Jersey City and Hoboken by three under-river tunnels, which are used for electrically driven trains.

In the main island, Manhattan, there is a great rush of traffic along a north and south line ; and to cope with this there are three levels of trains—overhead, shallow and deep tubes. To deal with the traffic from across the rivers there are the tunnels and many ferries.

Most of these features are shown on the map, and illustrate the way in which modern engineering has had to develop in order to deal with the results of the geographical forces which have concentrated the United States on New York City.

UNITED STATES CITIES.

	Population in millions.		Population in millions.
New York	4	Cleveland	0.5
Chicago	2	Buffalo	0.4
Philadelphia	1	Pittsburg	0.4
St. Louis	0.6	Detroit	0.4
Boston	0.6	Cincinnati	0.3
Baltimore	0.6	San Francisco	0.3

About one-eighth of the population of the United States is confined to the twelve largest cities, of which nine are ports on the ocean, lakes, or river.

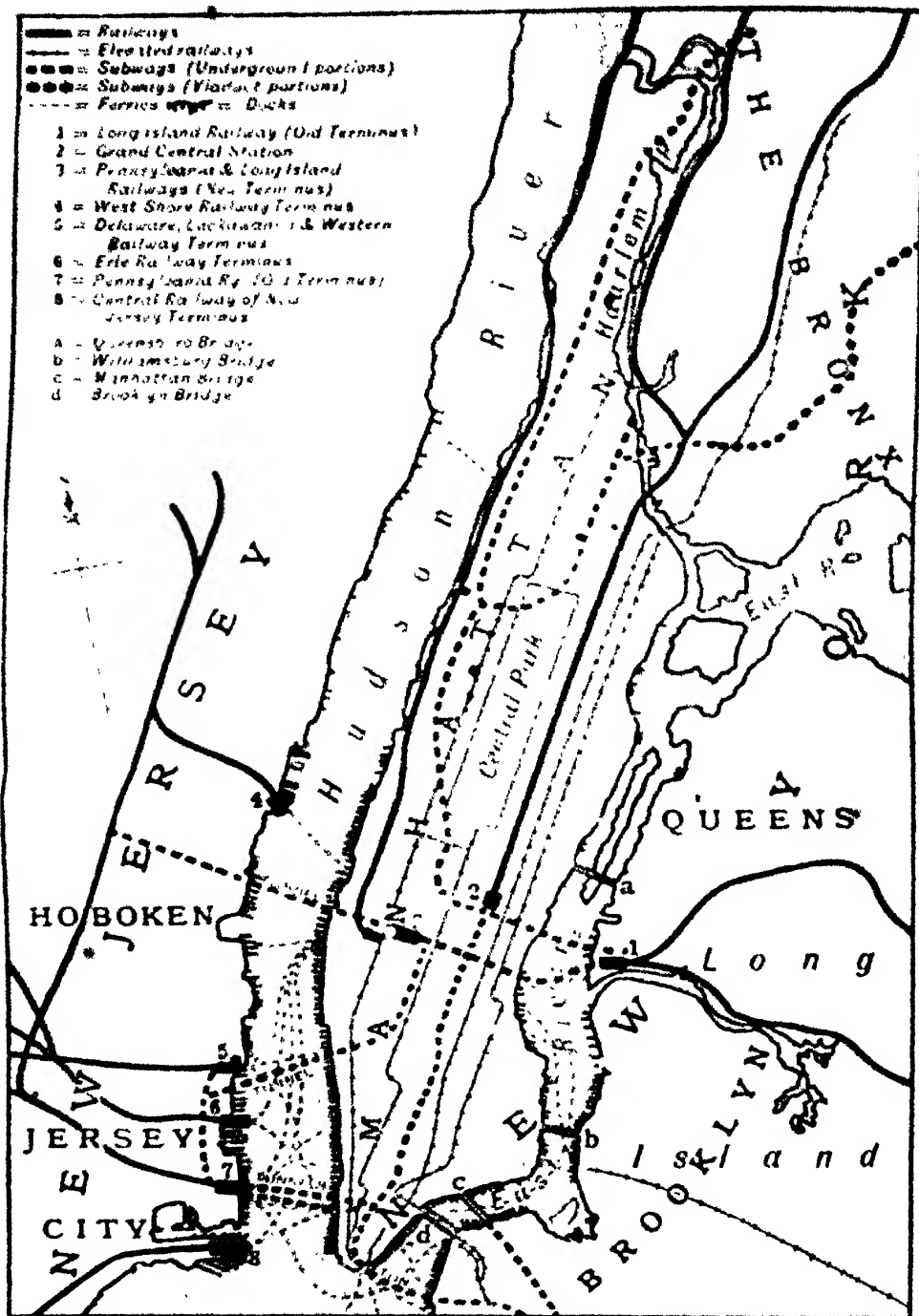


FIG. 26 — NEW YORK.

The other three towns, **Cleveland, Pittsburg and Cincinnati**, are in the Ohio Valley, in the industrial district.

Chicago, Kansas City, St. Louis are important cattle and pig markets, and deal with millions of animals per annum. **Omaha, Buffalo** and **New York** have large sheep markets. These centres of the trade in animals are on the railways to the east of the grazing lands, which lie chiefly between the Mississippi and the Rocky Mountains.

Minneapolis, Duluth, St. Louis, Kansas City are important centres of the trade in cereals.

QUESTIONS.

1. Compare China and the United States with respect to climate, surface, river systems, products and resources, manufactures and industries, people. (Alb.)

2. Describe that portion of the United States of America that lies between the Atlantic and the Mississippi. (U.A.)

3. Contrast the industries of the Atlantic Coast of the United States with those of the Great Plains of the interior. (U.S.)

4. Describe the chief physical divisions of the United States of America and the nature and causes of their climates. Show how in the case of four of its prominent cities their position and development have been influenced by economic or strategic considerations. (U.M.)

5. Contrast the natural and commercial resources of Canada and the United States. Refer especially to the transcontinental and Great Lakes trade. (N.Z. Ed.D.)

6. Describe the river systems and over-sea trade of the United States of America. (Newf.)

7. On a map of the United States mark : (a) the river systems, (b) the grazing, grain, mining and manufacturing areas : (c) the exact location of 20 important cities. (Man.)

8. Name and locate five great seaports on the Atlantic Coast of the United States. What two great cities are situated on Lake Michigan, and what exports are sent out from them? (P.E.I.)

50. The Shore Lands of the Gulf of Mexico.

1. Contrast the climate of the Mediterranean lands of America with that of the Mediterranean lands of the Old World.

2. Contrast the position of the proposed Panama Canal with respect to (i) the land hemisphere (Fig 2), (ii) the routes from the United Kingdom to Singapore and New Zealand.

3. Compare the summer rain grass-lands—savannahs—of the Orinoco with those of the Sudan in regard to nearness to oceanic highways of communication (Fig. 26).

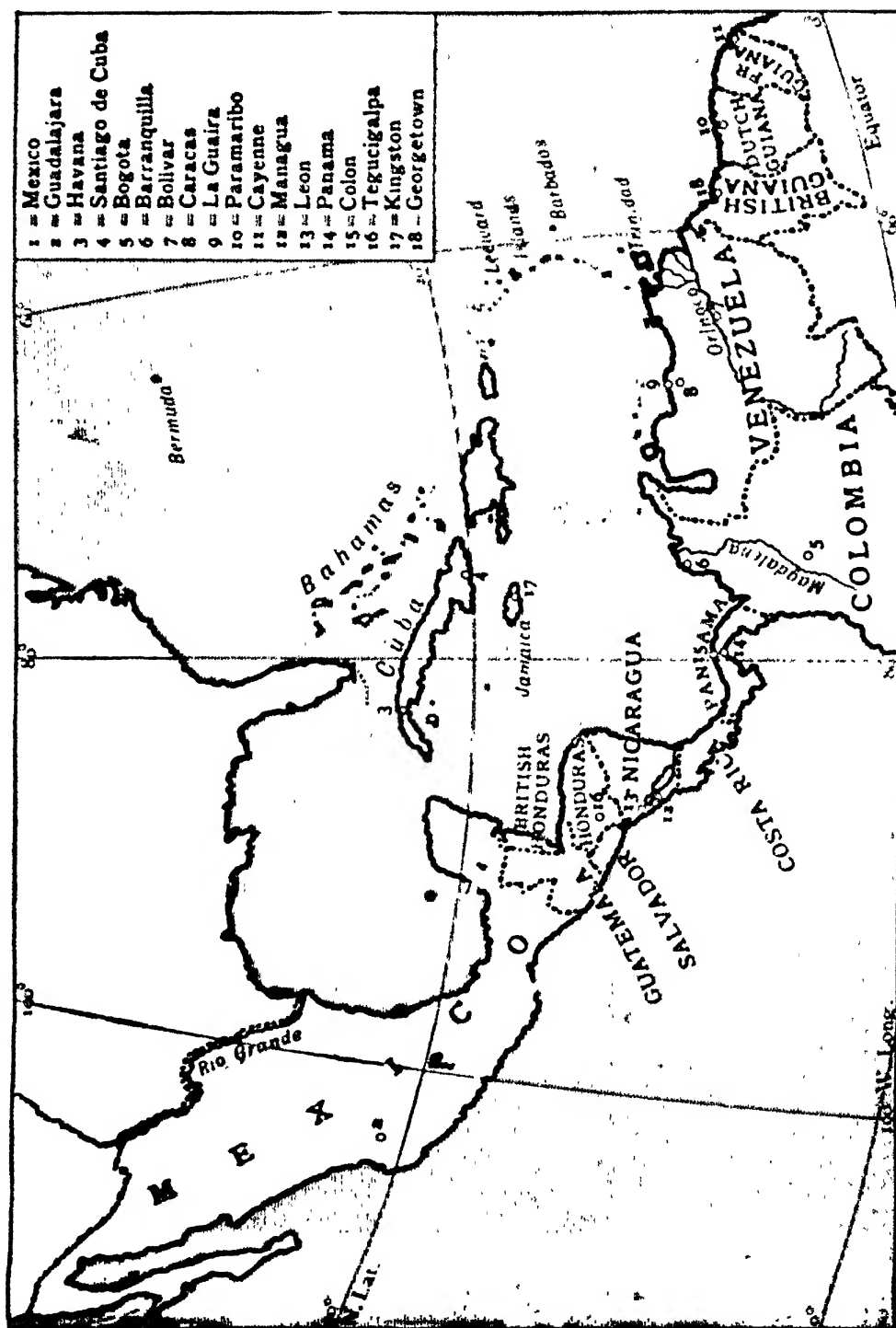


FIG. 57.—CENTRAL AMERICA.

Emory Walker

4. Compare the semi desert area of Mexico and that of the South-Western United States with the semi desert areas of Africa and South-Western Asia in regard to nearness to oceanic highways of communication (Fig. 26).

	Area in thousand sq. miles	Population in millions.	Animals in millions.	
			Cattle	Sheep
Mexico	767	14	5	3
Guatemala	48	2	0.2	0.1
Honduras	46	0.5	0.6	--
Salvador	7	1	--	--
Nicaragua	49	0.5	--	--
Costa Rica	23	0.4	0.3	--
Panama	432	0.4	--	--
Colombia	535	4	3	--
Venezuela	99	3	2	--
Dutch Guiana	46	0.1	--	--
French Guiana	34	0.3	--	--
Cuba	44 *	2	3	--

Size, position, etc. Nearly all the countries named above are shore lands of the Gulf of Mexico. **Cuba** is the largest of the islands in the Gulf; and **Salvador**, which is the smallest state in Central America, has only shores to the Pacific Ocean.

Mexico is about as large as France, Germany and Scandinavia combined, and about one-fifth the size of the United States, with about one-sixth of the population of that country.

Cuba and **Guatemala** are each about as large as Newfoundland, and have about ten times the population. **Honduras** and **Dutch Guiana** are about as large as Cuba.

The other states are small and sparsely populated.

Relief, etc. Mexico is an elevated plateau with two escarpments, or cliff edges, and a coastal plain to the Gulf of Mexico; in this respect the country resembles South Africa. The only important river is the **Rio Grande**: there are numerous water-courses which are rivers only in the rainy season, and in this respect Mexico resembles the semi-arid regions of the Old World. (Fig. 6.)

The water-parting between the Atlantic and the Pacific Oceans is near the West Coast, and the elevated land continues with gaps southwards to **Panama** and **Colombia**.

Colombia contains the northern ends of the **Andes**, and between them the valley of the **Magdalena** : it includes a small portion of the catchment basin of the **Orinoco**.

The lower **Orinoco** valley forms **Venezuela** ; while the **Guianas** extend from the shore to the northern edge of the catchment basin of the **Amazon**.

East of the **Orinoco** there are wide coastal plains.

Mexico.—About 9 per cent. of Mexico is forested ; 25 per cent. is pasture land ; and about 6 per cent. is cultivated.

The chief crop is **sisal hemp**, which is specially useful for ship's cables, and is only grown in Central America and the Bahamas. Mexico produces about 400,000 tons annually. Maize, wheat and barley are also grown (p. 69).

With the spread of the cultivation of **alfalfa** on semi-desert lands, as in Arizona and Argentina, the cattle industry of Mexico, which is small at present, should increase.

Mexico is mainly a **mining** country.

MEXICAN MINERAL PRODUCTS.

		Total.	Percentage of World's Production.
Silver	10 ⁶ oz. Troy	81	
Gold	"	07	
Copper	10 ³ tons	142	21
Lead	"	82	8
Zinc	"	43	4

Mexico is the largest silver producer in the world.

Guatemala, Honduras, Salvador and Costa Rica are agricultural countries of the type of **British Honduras**. They are said to contain rich mineral deposits. The produce is largely coffee, bananas, maize, with some rubber, cedar and **mahogany**.

Panama is agricultural and, like her neighbours, can rear cattle on the pasture lands.

The main interest of the country is centred on the cutting of the Panama Canal (p. 231), on which about 34,000 people are employed. The work is being done under the authority of the United States, whose officials have converted a fever-stricken area into a healthy district. The canal will probably be opened in 1915.

Nicaragua produces rubber and hard timber.

Colombia and **Venezuela** are capable of similar productions to those of Mexico, but there is little attempt to realise the possibilities of these countries.

Dutch and **French Guiana** produce sugar, bananas, rice and maize, and mine gold, and are similar to British Guiana.

Cuba produces mainly **sugar** (p. 55) and **tobacco** (p. 56). Cocoa, maize and bananas are also grown; while **cedar** and **mahogany** are obtained from the forests in the island.

As in the case of the British West Indies, the trade of the shore lands of the Gulf of Mexico is largely with the United States, and tends to be concentrated on New York (p. 268).

CHIEF TOWNS AND POPULATION.

COUNTRY.	TOWNS.
Mexico	Mexico (370,000), Guadalajara (101,000).
Cuba	Havana (300,000), Santiago de Cuba (45,000).
Colombia	Bogota (125,000), Barranquilla (40,000).
Venezuela	Bolivar, Caracas, La Guaira.
Dutch Guiana	Paramaribo (35,000).
French Guiana	Cayenne (12,000).
Nicaragua	Managua (35,000), Leon (63,000).
Panama	Panama (20,000), Colon (3000).
Honduras	Tegucigalpa (35,000).

The people in Central America are, on the whole, country dwellers. The chief towns have usually a large population, and the other towns are very small.

Volcanoes, etc. In the West Indies, and along the isthmus of Central America, volcanoes and earthquakes point to the disturbed condition of the earth's crust.

Many West Indian islands are like Bermuda, of **coral** formation.

QUESTIONS.

1. Write a note on Jamaica, referring particularly to its climate, industries, capital and the commercial advantage of its position. (Alb.)
2. What is the staple industry of Newfoundland, and where is it carried on? (Newf.)
3. Write a short account of the climate and products of the British West Indies. (L.U.)

51. South America.

1. Record the climatic and other facts regarding Argentina, Brazil, Chile.
2. Record the proportion of the world production of cereals (p. 69) and of the world stock of animals (p. 70) in Argentina and Uruguay.
3. Record the proportion of the world production of coffee and rubber of Brazil.
4. Find the distances from Buenos Aires to Rio de Janeiro and to Valparaiso by sea and by land respectively.

Position. South America is a south pointing peninsula like Africa, containing, among others, the large countries of **Argentina** and **Brazil** on the Atlantic side and the long narrow countries of **Chile** and **Peru** on the Pacific side.

Relief.—The mountains—the **Andes**—are on the west, and lie close to the Pacific Ocean—east of the mountains are the plains of the Amazon and Plate rivers, and further east the **Highlands of Brazil**.

Separated from the Andes by the Orinoco are the Guiana uplands, forming the northern boundary of the Amazon valley.

Climate and vegetation. As in Africa, there are all types of climate and vegetation regions polewards from the equator—details have been considered in Chapter 44.

Size and population. The size and population of the various States are given in the table :

STATE	Area in million sq. miles	Population in millions	Density of Population per sq. mile	Area compared with that of Brazil
Brazil	3	17	5	1
Argentina	1	5	5	0.34
Peru	0.7	3	4	0.21
Chile	0.3	3	9	0.09
Ecuador	0.1	1	10	0.02
Uruguay	0.1	1	13	0.02
Paraguay	0.2	1	3	0.05

Brazil is the largest State, while Uruguay and Chile are the most densely peopled.



FIG. 88.—SOUTH AMERICA: RELIEF.

GEORGE PERLES 1899 C.

Sub-divisions of Argentina.—There are four main regions in Argentina.

The **north** has hot summers and dry winters, and is, on the whole, arid. The special crops are tobacco and sugar cane : this region includes about two-sevenths of the whole area.

The **south** is about the same size as the north, and includes most of **Patagonia** ; it is mainly pastoral.

The **west** is about half the size of each of the other divisions, and includes the land which lies close against the Andes ; the climate is arid and irrigation is necessary ; cattle are fattened in this area before they are taken across the mountains to Chile.

The **east** consists of about two-sevenths of the country, and includes the area which slopes towards the Plate estuary.

Tobacco and the **sugar cane** are cultivated only in the north ; **cereals** are practically limited to the east ; the most important agricultural industry in the west is in connection with cattle and alfalfa ; while most of the **cattle** are in the north and east, and most of the **sheep** in the east and south.

ARGENTINA : POPULATION, CULTIVATION, ANIMALS.

	North	West	East	South	Total
Population in 1900,000	12	5	41	1	59
Railways in 100,000 miles	3	4	70		77
Sugar cane in 1,000 acres	171		5		176
Tobacco	40		5		45
Maize	300	122	6,530	5	7,023
Wheat	87	72	13,950	37	14,146
Alfalfa	121	1,055	7,580	32	8,791
Percentage of area cultivated	1	1	16		4
Horses in 1,000,000	1.4	0.3	3.4	0.3	5.4
Cattle	8.4	1.2	15.6	0.7	25.9
Sheep	3.6	0.9	61.0	8.8	78.2
Pigs	0.2	0.1	2.0		2.9

A farming country.—The facts shown above are evidence of the great importance of agriculture in Argentina ; and of the whole exports of the country 43 per cent. consist of pastoral products and 54 per cent. of arable products. The arable products exceed the

pastoral, but as only about one-sixth of the eastern province is laid down in arable land it becomes obvious that Argentina can supply in the future greater quantities of wheat and maize than at present. Since this is a new country, sheep and cattle are now grazing on lands which can, with the development of population and means of communication, be laid down under the plough.

A typical stock farm. The 'estancias' or ranches of Argentina vary from 3000 to 700,000 acres in extent, but on the average they include about 250,000 acres. This land is fenced into fields from 200 to 3000 acres each, and care is taken that each field shall have either a stream running through it or wells and water troughs. Cattle are kept in separate paddocks, and sheep are herded in flocks of about 1500 to 2000. Centrally situated are the houses of the owner and the manager with the labourers' quarters, with outbuildings and sheds. Near these are an orchard, a vegetable garden and groups of trees.

The stock farms are of three kinds: for the breeding of sheep, cattle and horses; for breeding and fattening; and simply for fattening sheep and cattle for the markets.

In some cases parts of the farm are given up to cultivation, and in other cases dairying work is undertaken in addition to breeding and fattening. A few farms are devoted solely to dairying.

EXPORTS FROM ARGENTINA OF FARM PRODUCE.

To.	Cattle	Horses	Sheep	Cut Bee	From	Wool	Wool	Wheat	Maize	at
	In hundreds.			In thousand tons.				In thousand tons.		
Brazil	20	12	2					226	0	118
Uruguay	277	13	484						3	1
United States					12	7	4			
United Kingdom	4			31	60	5	16	2	245	184
Germany					16	37		108	57	1
Belgium			377		10	10		244	115	2
France		1			2	64		43	69	
Other Countries	445	42	242	7	1	0	12	1	1811	838
Total	748	72	1105	138	70	54	155	3	2681	1275

Argentine trade for farm products.—Argentina supplies flour

and wheat to Brazil, live animals to Uruguay and Belgium and meat to the United Kingdom.

Wool is largely sent to France, Germany and Belgium. Wheat and maize are exported to Western Europe. Argentina thus competes with the United States, Canada and Australasia in supplying food-stuffs, etc., to the United Kingdom. Argentina supplies about one-tenth of the meat and about one-eighth the wool (p. 44) used in the United Kingdom.

Ecuador.—The chief product of **Ecuador** is cocoa, a large quantity of which is sent annually to Havre to be re-distributed to countries in Europe.

Paraguay, Uruguay.—Both **Paraguay** and **Uruguay** are agricultural countries largely devoted to cattle-rearing.

Brazil.—The **rubber** production of the forested banks of the Amazon, the **coffee** plantations of the eastern slopes of the Brazil Highlands are the important elements of the prosperity of **Brazil**; **Yerba maté** (native tea) and **manganese ore** are of smaller importance.

Chile.—**Chile** is an agricultural country which depends for its importance upon its export of **nitrates** from the arid region near the desert of Atacama. This export amounts to nearly two million tons per annum, valued at about £16,000,000.

Peru.—Cotton, coffee and sugar on a small scale are the main products of **Peru**, which is almost entirely agricultural, with some mining, as in Chile, of copper, gold and silver.

Bolivia.—**Bolivia** is entirely inland, and has agriculture and mining as in Chile.

SOUTH AMERICAN TRADE IN £1,000,000

	ARGENTINA		BRAZIL		CHILE	
	Imports	Exports	Imports	Exports	Imports	Exports
United Kingdom	11	20	8	8	5	8
United States	2	8	3	19	1	3
Germany	7	9	4	7	4	5
Belgium	6	3	1	1		
France	8	5	2	4	1	2
Argentina	—	—	2	3		
Brazil	3	2	—	—		
Others	22	10	10	4	4	1
Total	59	57	30	46	15	19

South American Trade.—On the whole, the trade of South America is with the United Kingdom and the United States, while Germany has a steadily increasing trade, especially with Argentina and Chile.

EXPORTS IN 1000 TONS.

From Brazil	-	Cocoa (22), coffee (720), cotton (24), yerba maté (44), manganese ore (174), rubber (32), tobacco (28).
.. Chile	-	Nitrate (1500), wool (4), copper (23), copper ore (20), barley (27)
.. Uruguay	-	Meat products (51), wool (41).

The domestic produce exported by Brazil, Chile and Uruguay is small in comparison with that from Argentina (p. 283), except in coffee and nitrate.

IMPORTS.

	Quantity.	To:		
		Brazil.	Chile.	Uruguay.
Cotton goods	£10 ⁶	3	1	0.5
Iron and steel goods	..	2	2	4
Woollen goods	..	0.5	0.6	—
Beef	10 ³ tons	45	—	—
Cod-fish	..	24	—	—
Wheat	..	0.3	—	—
Rice	..	65	—	6
Coffee	..	—	2	1
Sugar	..	—	48	19
Tea	..	—	1	—
Yerba maté	..	—	3	10

All countries require manufactured articles, both textiles and iron goods.

Brazil requires food-stuffs such as meat and rice, while Chile and Uruguay require chiefly sugar and yerba maté, which is an important substitute for tea or coffee.



FIG. 89.—SOUTH AMERICA: COMMUNICATIONS.

CHIEF TOWNS.

COUNTRY	Towns
Argentina	Buenos Aires (1,190,000), Rosario (150,000), Córdoba (53,000), Tucumán (55,000).
Brazil	Rio de Janeiro (811,000), Bahia (230,000), São Paulo (348,000), Pernambuco (150,000).
Chile	Santiago (333,000), Valparaíso (162,000).
Peru	Lima (141,000), Callao (31,000).
Bolivia	La Paz (79,000), Cochabamba (25,000).
Ecuador	Quito (70,000), Guayaquil (80,000).
Paraguay	Asunción (61,000).
Uruguay	Monte Video (316,000).

Communications, etc.— **Buenos Aires** is the most populous town of South America, while **Rio de Janeiro** is second in population.

The railway development of South America is most extensive in Argentina, which has recently made a line across the Andes into Chile (Fig. 89).

As in Australia, Canada and the United States, the development of the resources of these vast agricultural lands is dependent upon railway communications, and hence Argentina has the most promising future of any South American state.

ARRIVALS OF SHIPS AT BUENOS AIRES.

NATIONALITY	Steam	Tonnage in 1000 tons	Sailing	Tonnage in 1000 tons	Total Tonnage in 1000 tons
British	966	2197	33	39	2236
German	170	517			517
Italian	125	318	48	49	367
French	120	320			320
Others	263	295	167	165	460
Total	1644	3647	248	253	3900

The harbour of Buenos Aires is typical of those of Rio de Janeiro and Valparaíso. More than five ships a day enter the port on the average, and of these roughly three are British.

SUMMARY

1. South America is mountainous on the west, with immense lowlands towards the east.
2. Brazil is the largest and most populous state, Argentina the most important.
3. South America is largely agricultural as in Argentina, and there is some mining, specially in Chile.
4. The ranching industry of Argentina is similar in method to those of Canada, Australia and the United States.
5. Buenos Aires and Rio de Janeiro are the most important centres of population and industry.

QUESTIONS

1. Describe the physical features, climate, products, trade and government of Argentina. Name the chief towns and seaports associated with the main industries. (U.M.)
2. Draw a map of South America showing the chief ports, rivers and mountain ranges. (U.S.)
3. The Argentine is one of New Zealand's competitors in the English markets; compare the natural advantages possessed by the two countries. (N.Z. Ed. D.)
4. State the position of Argentina and Chile. Point out how they differ (a) in physical characteristics, (b) in climate, (c) in products. Account as far as you can for the difference in climate and products. (L.U.)
5. Where are the following obtained in South America, and in what kind of country: sugar, india rubber, cocoa? (L.U.)
6. Describe the general physical features of South America, and explain why the rainfall is so excessive in some parts and so small in others. (C.P.)
7. Draw a map of South America, naming the deserts and shading the areas of heavy rainfall. Account for the position of the deserts and of the rainy regions. (Sc. Ed. D.)
8. Between what places in Europe on the one side, and of South and Central America (including the Gulf of Mexico) on the other, is an extensive trade carried on across the Atlantic? Say what you know of the nature of the trade. (N.Z. Ed. D.)

SECTION V : EUROPE.

52. Europe.

1. Record the dimensions and area of the continent.
2. Record the comparative sizes of Germany, France and the British Isles as fractions of the size of Russia in Europe.
3. Record the estimated percentages of lowland, upland and mountain.
4. Record the distance from Constantinople to St. Petersburg and to London, and that from Berlin to Madrid.

Position.--Europe consists of three parts: (i) the coast lands of the west, facing the Atlantic Ocean; (ii) the coast lands of the south, facing Africa across the Mediterranean Sea; and (iii) Austria-Hungary and Russia to the east. The western shore lies near the middle of the land hemisphere, while the Mediterranean lands lie near the great traffic-way through the Suez Canal between west and east. By her sea-ways Western Europe has close contact with the growing nations of the Americas, of South Africa and of Australasia; by her sea-way through the Suez Canal and her land ways she is in communication with the great countries of the East.

Size and population.--The area of Europe amounts to about 3½ million square miles, which is about the same size as Canada, or the United States, and a little more than that of Australia. The table gives the sizes of the nine largest countries.

STATE.	Area in thous and sq. miles	Percentage of area of Europe.	Population in thousands	Percentage of total.	Density per sq. mile.
Russia	2052	55	124,656	32	61
Austria-Hungary	241	6	45,406	12	186
Germany	200	5.5	62,007	16	295
France	207	5.5	39,267	10	190
Spain	105	5.2	19,639	5	100
Sweden	173	4.6	5,378	1	31
Norway	124	3.3	2,321	—	19
United Kingdom	121	3.2	44,100	12	365

Russia has more than half the area of Europe, while the remaining half contains many States ranging from the largest, **Austria-Hungary**, about one-ninth the size of Russia, to the tiny Republics of Monaco and Andorra. The densest populations are in **Holland** and **Belgium**, respectively 400 and 500 per square mile.

The main features of the relief of Europe are two which continue from Europe across Asia, viz., the great mountain line from the **Sierra Nevada, Atlas, Apennines, Alps, Carpathians, Caucasus** to the mountains of Central Asia, and the wide plain sloping down from this high land towards the northern seas. Russia and the major portion of Germany are included in this lowland.

The mountains of the **Pyrenees** and the **Balkans** separate the lands to the south of them from the main mass of Europe. The south-east corner of the British Isles contains what is really an integral part of the great Eurasian plain, and the uplands of Ireland and Scotland strike across in a north-easterly direction along the edge of the plain in a line with the corresponding uplands of Scandinavia.

The British Isles rise from a shallow sea which is nowhere deeper than 100 fathoms, and are therefore Continental Islands.

Mountains in relation to human movement.—The Alps give the best example in the world of a mountain mass lying across the ways in which man's activity has tended to expand, which has been thoroughly conquered by human agency. First the passes and then the tunnels have been utilised by men as ways of communication and transport. In this respect, the Alps are to be contrasted with the Pyrenees which are a barrier to communication except round the girds, and with the Himalayas which have isolated India. The most famous Alpine tunnels and passes are shown in Fig. 91.

Western Europe.—To the north-west of the mountain chain of the Alps lies a series of uplands of lower elevation, the **Auvergne** plateau in France, the **Vooges, Black Forest** and **Harz** in Germany, and the plateau of **Bohemia**. On the outer edge of the continent, lying in a parallel direction from south-west to north-east, is a second series of elevated lands: the uplands of Ireland in the north-west of that island, the uplands of Wales, North England, Scotland, and those of Norway.

Between these series of uplands lies the western part of the great European plain, which really includes the extremely shallow North and Baltic Seas. The plain consists of the south-eastern

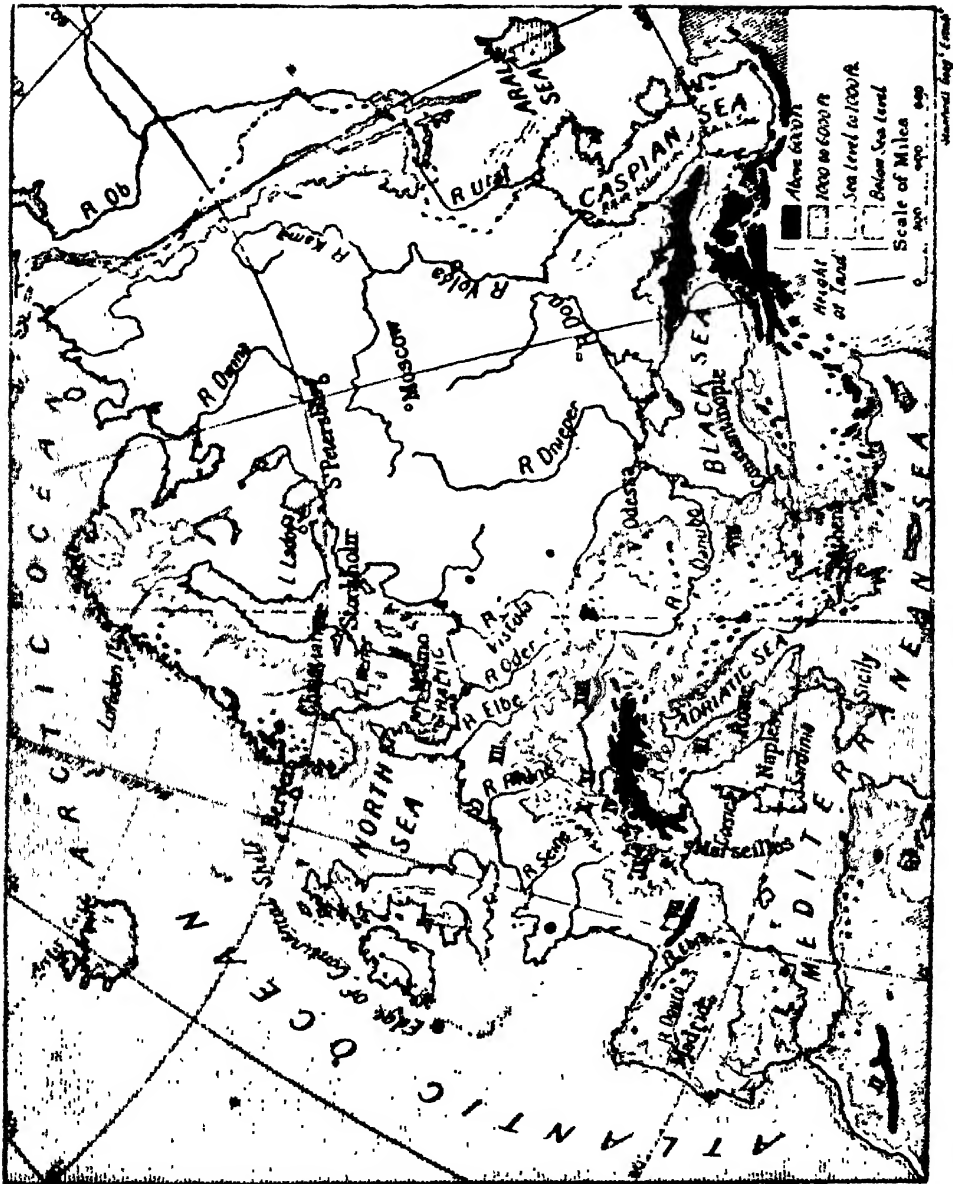


FIG. 90.—EUROPE: RELIEF.

MOUNTAINS.

- I. Sierra Nevada.
- II. Atlas.
- III. Apennines.
- IV. Jura.
- V. Carpathians.
- VI. Caucasus.
- VII. Pyrenees.
- VIII. Balkans.
- IX. Cevennes.
- X. Vosges.
- XI. Black Forest.
- XII. Harz.
- XIII. Bohemian Forest.

part of **England**, the western, north-western and northern parts of **France**, **Holland** and **Belgium**, as well as the northern part of **Germany**. Across this plain wind the rivers which flow into the North and Baltic Seas; and on this plain live the peoples of Western Europe - for the densely peopled districts of England

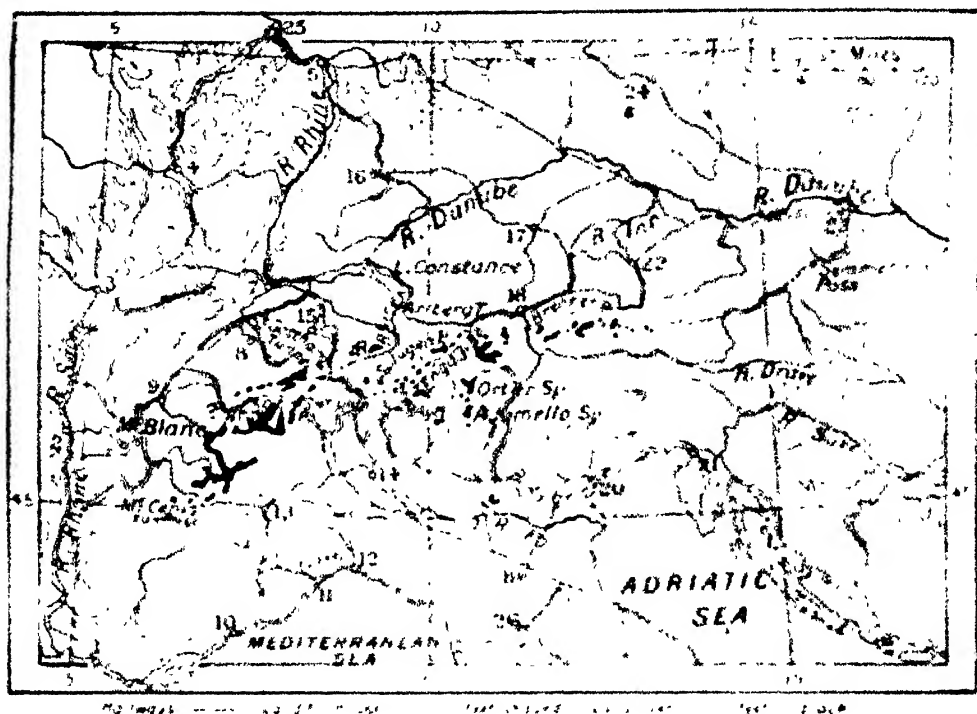


Fig. 98 - THE ALPS

- | | | | | |
|----------------|------------|---------------|---------------|--------------|
| 1. Marseilles | 8. Elbe | 12. Genoa | 17. Munich | 22. Salzburg |
| 2. Lyons | 9. Berne | 13. Turin | 18. Innsbruck | 23. Vienna |
| 3. Dijon | 10. Geneva | 14. Milan | 19. Bologna | 24. Pilsen |
| 4. Nancy | 11. Nice | 15. Lucerne | 20. Venice | 25. Coblenz |
| 5. Mainz | 16. Savona | 16. Stuttgart | 21. Trieste | 26. Florence |
| 6. Straassburg | | | | |

in Lancashire and Yorkshire, on either side of the Pennine upland in North England, consist of two extensions of the plain towards the north.

Rivers. The rivers of Europe are given in the table on p. 293. The rivers of Europe, except the **Rhone**, are navigable for a large part of their length (Fig. 98). Most of them, again excepting the **Rhone**, flow for the major part of their courses across the European plain and have a comparatively slight fall. They have

always been used as channels of traffic and communication from the western ocean towards the inland uplands which could also

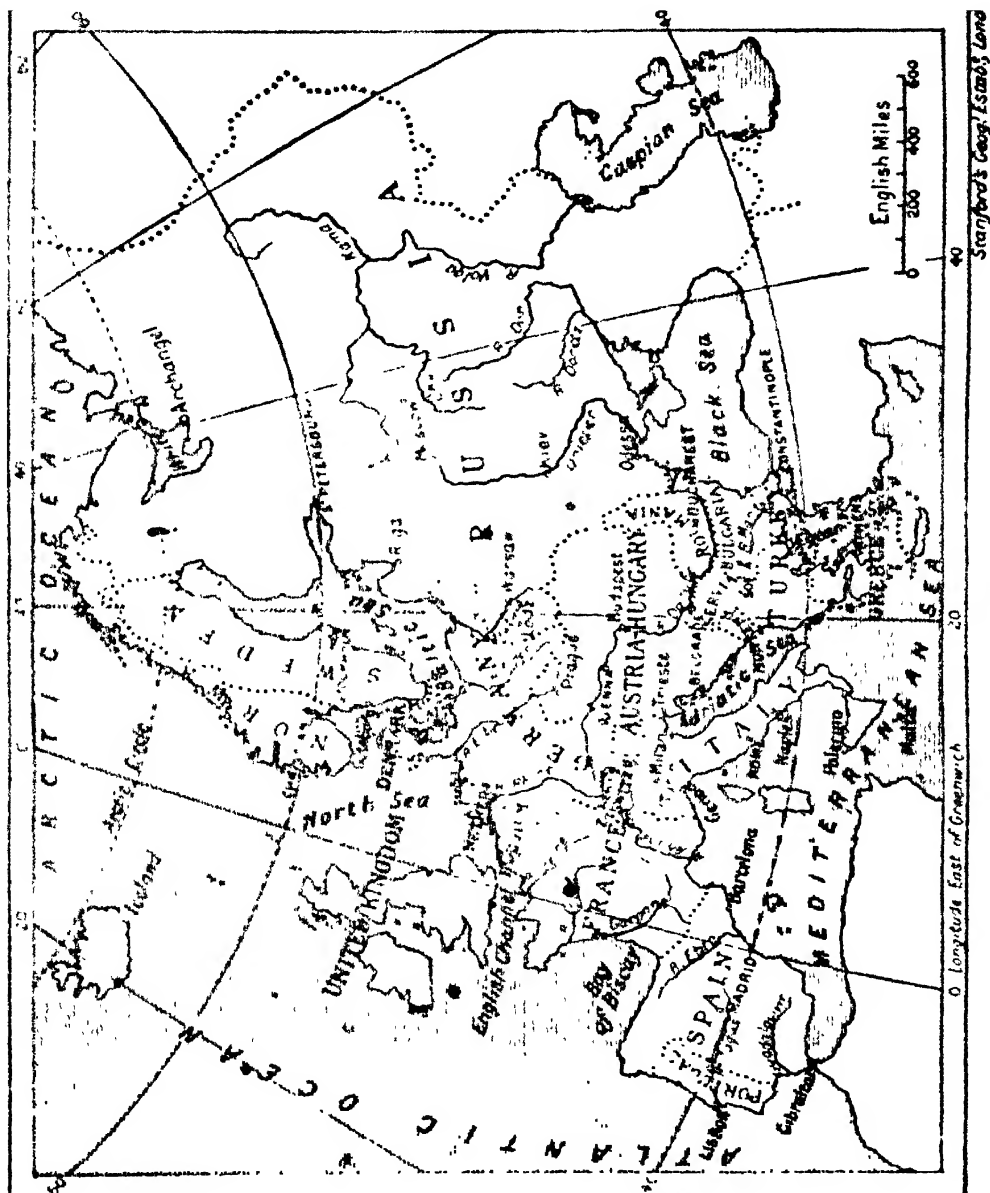


FIG. 92.—EUROPE: POLITICAL.

be reached from the Mediterranean Sea. In recent times they have been canalised in parts, Fig. 98, and connecting canals have been built to facilitate the transfer of goods across country from

east to west. These canals as a rule keep as close as possible to the 500 ft. contour line. This plain of Western Europe is the one part of the world where canals have been most developed, and it is to be noted that the countries where this development occurs are those of dense population, Holland and Belgium.

RIVER.	Length in miles.	Area of Basin in sq. miles.	RIVER.	Length in miles.	Area of Basin in sq. miles.
Elbe	720	55,000	Oder	550	43,000
Rhine	810	87,000	Vistula	650	74,000
Seine	480	30,000	Dnieper	1,330	202,000
Loire	540	48,000	Ebro	470	30,000
Rhone	1,100	807,000	Thames	210	6,000
Danube	1,800	315,000	Severn	210	6,000
Don	1,117	166,000	Shannon	225	6,000
Volga	2,350	563,000	Po	420	27,000

53. The Climate of Western Europe.

Record the temperatures, pressures, etc., in summer and winter at latitudes 30°, 40°, 50° N. and on the eastern and western shores of the Atlantic Ocean.

The climate of Western Europe.—The climate of Western Europe is remarkable for its abnormal winter conditions, and provides an excellent opportunity for the examination of the various forms of climatic data. It is usual to mark temperatures by means of isotherms, such as those in Fig. 13, but for the winter temperatures of the North-east Atlantic Ocean lines have been made called **isonomalous lines**. In Fig. 93 such lines are shown marked 20° F., 30° F. and 40° F.; all places on the line marked have been found by laborious calculation to have a temperature on the average during the month of January which is 20° F. higher than the average temperature for all places with the same latitude: this implies that these places are considerably warmer than usual for their latitude, but within the area enclosed by this line it is found that there are places which have an abnormal January temperature of more than 40° F. above the average: from this it follows that the area shown in Fig. 93 is much

warmer in winter than for example the neighbourhood of Hudson Bay.

On Fig. 93 a dotted line joins all places where the lowest temperature in the year is 14° F.; this line forms a loop so that all places in Canada, in Iceland, in Scandinavia, France and Germany (except just along the shore line) have a temperature in January which drops at least to 14° F., while the British Isles

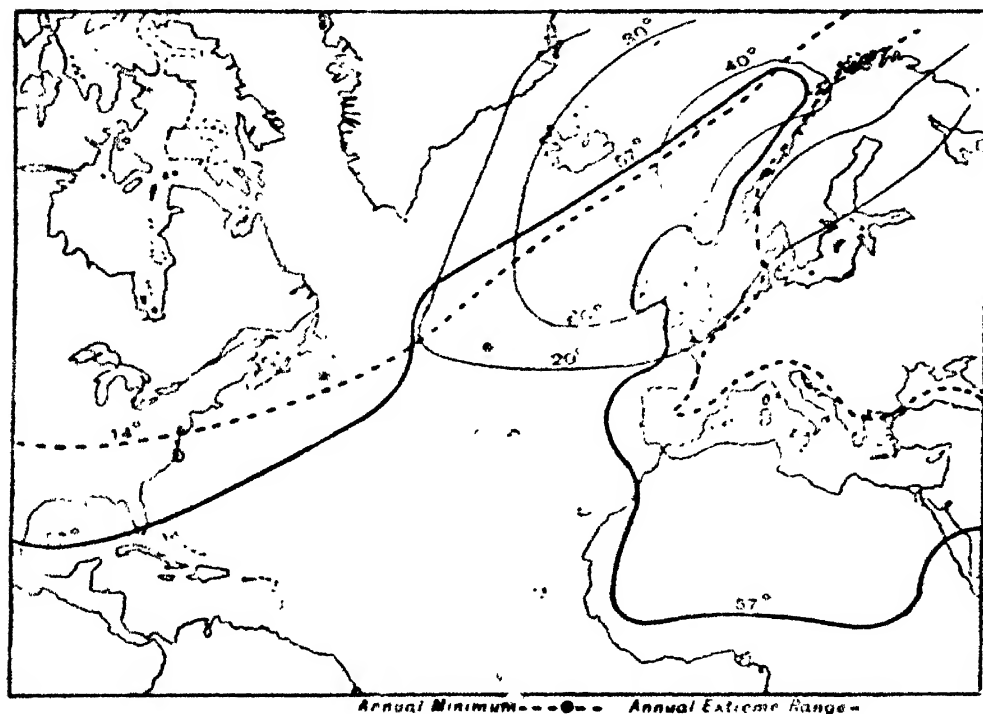


FIG. 93.—WINTER CONDITIONS

are considerably warmer even on the coldest winter nights. The dark line in Fig. 93 joins all places where the difference between the coldest and the hottest temperatures recorded amounts to 57° F.; all places on the landward side of this line vary in temperature more than this, and consequently it follows that the temperatures on the shorelands of Western Europe do not vary so greatly as those on the shorelands of Eastern America. All this evidence points to the fact that in winter Western Europe is warmer than the average. Western Europe has a more equable climate.

Rainfall.—The loop shown by the line joining all places with a rainfall of 2 in. in the month of January (i.e. the Jan. 2 in. isohyet), shown in Fig. 94, is similar to the loops made by the temperature lines in Fig. 93. The 4 in. isohyet is parallel but nearer the coast. In the summer, in July, practically the whole of Europe (except the Mediterranean lands) and of America (except the extreme north), which is shown in Fig. 94, has a rainfall of at least 2 in. It thus appears that the two continents have similar rainfall in summer, but different rainfall in winter; for example

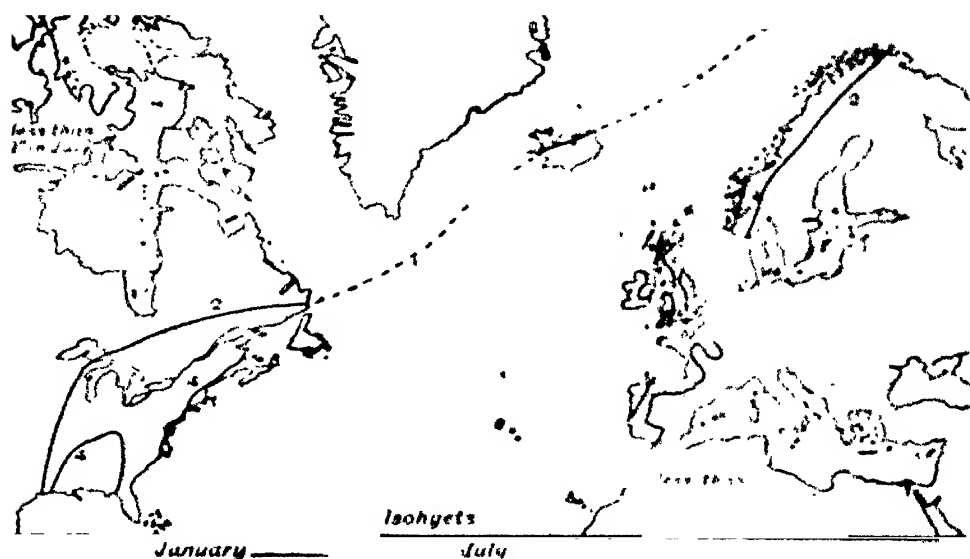


FIG. 94.—NORTH ATLANTIC RAINFALL.

compare in Fig. 94 Scandinavia with Greenland, and the British Isles with Newfoundland. In winter the shorelands of Western Europe are wetter than the average.

Cloudiness.—**Isonephæ** are lines joining all places with an equal average number of tenths of the sky cloud-covered during a given period. In Fig. 95 these lines are shown for Europe and Africa during the month of January. The region where the skies are clear, that is less than two-tenths cloud-covered, is the arid region of the Sahara and Arabia. Passing northward through the region of the winter rains of the Mediterranean the sky becomes more overcast, and still further north the sky is clouded to the extent of seven-tenths on the average. The isoneph, numbered 7, by which this is shown turns almost to the north on the east of

Europe. Thus, Western Europe is warmer and wetter in winter than the average and at the same time the sky is very overcast.



FIG. 96.—JANUARY ISOBARS.

Pressures.—Fig. 96 shows the variations in pressure for various places in the area of the North-east Atlantic Ocean. In most cases the pressure is highest in the months of April, May, June, and lowest in the autumn and winter months. On the whole, also, the nearer the place is to Iceland the greater is the difference between the pressure in summer and in winter. In Fig. 14 the map shows that in the neighbourhood of Iceland there is a permanent area of low pressure round which the wind circulates

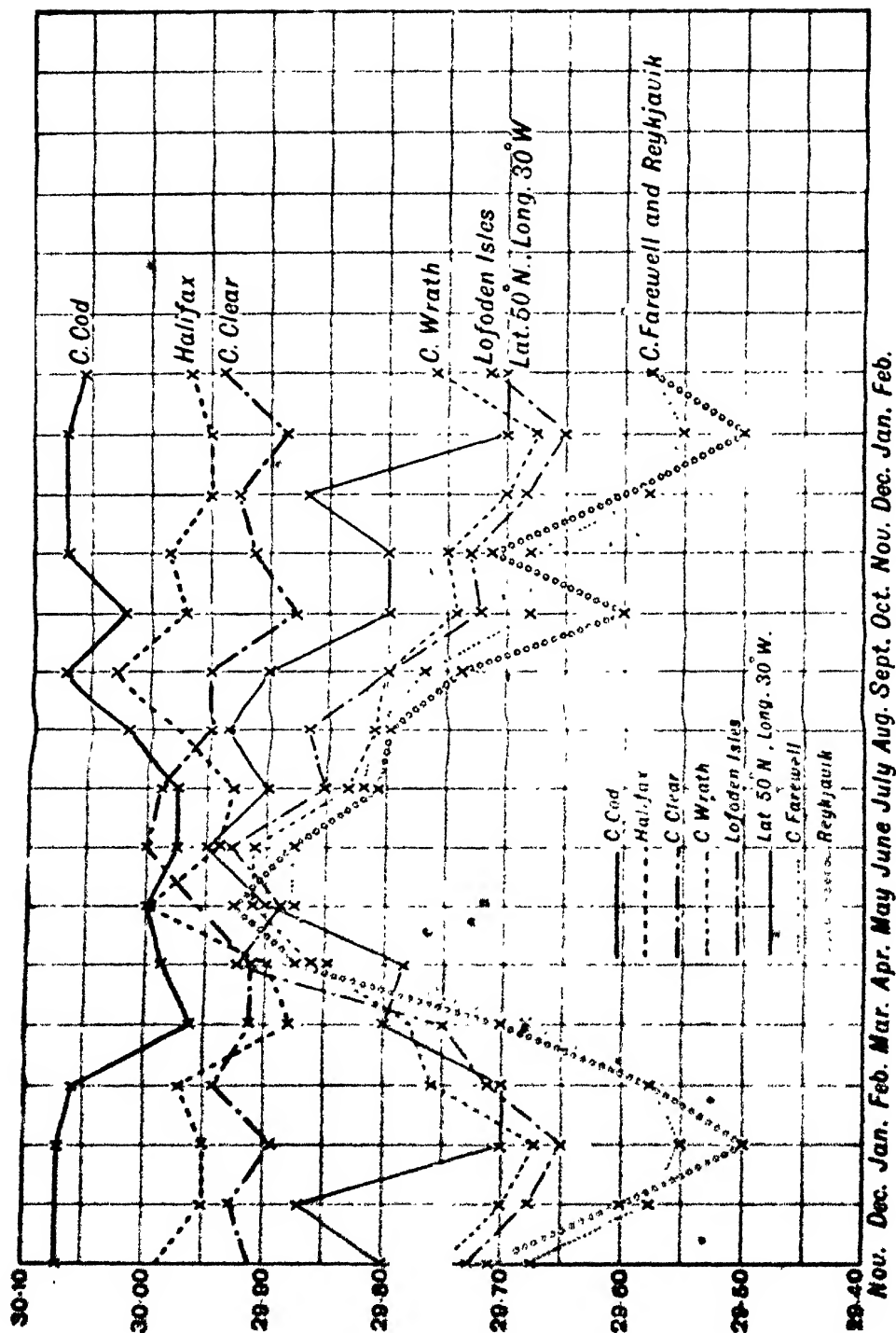


FIG. 96.—PRESSURE CHANGES.

in a direction opposite to the movement of the hands of a clock. The facts shown in Fig. 96 demonstrate how much this lowness of the barometer is increased during the winter months, and consequently it follows that the wind movements are much more forcible during that period.

This anti-clockwise circulation means a powerful succession of winds blowing towards the shores of Western Europe from the south-west; therefore this area has on-shore winds from a warmer area which blow stronger in winter at the time when it is warmer, wetter and cloudier.

North Atlantic storms.—Fig. 16, p. 31, shows the direction of the storms of the N. Atlantic and the paths of the cyclonic depressions over Western Europe. The numbers of cyclones which pass along the paths numbered I. to V. are shown in the table as percentages.

PATHS.	I.	II.	III.	IV.	V.	Total.
Autumn	10.4	4.0	2.9	4.8	7.5	29.6
Winter	9.6	6.7	4.8	2.1	5.6	28.8
Spring	6.0	2.3	3.3	2.3	6.7	20.6
Summer	7.7	2.5	0.6	7.1	3.1	21.0
Total	33.7	15.5	11.6	16.3	22.9	100.0

This table shows that the majority of the storms pass along track I. and that most of the storms usually pass along this path during the autumn and the winter. This path corresponds in direction with that of the loops of the isotherms, etc., in Fig. 93. These storm winds drive the surface waters of the ocean before them and tend to force against the coast lands of Western Europe warm surface water, and this tends to keep the winds themselves moist, with the result that in the British Isles the south-west wind is found to be the rain-bearing wind, so that the west side of these islands tends to be wetter than the east side (Fig. 94).

Similar conditions elsewhere.—In the North Pacific Ocean there occurs a similar swirl of air, similar winds and surface drifts of the ocean, with the result that the island of **Vancouver** has a climate corresponding with that of the **British Isles** in comparison with that of **Japan** which corresponds with **Newfoundland**.

SUMMARY.

1. The Icelandic low-pressure area is most marked in winter.
2. All the year round, especially in winter, cyclonic winds pass along storm paths towards Western Europe.
3. Consequently, Western Europe is warmer, wetter and cloudier in winter than Eastern America.
4. Western Europe has a more equable climate than Eastern America, and consequently the farm worker in the British Isles can work out of doors almost all the year round, which is not possible in America.

54. Climate (*continued*) and Vegetation.

1. Record the climate factors for Mediterranean and Eastern Europe.
2. Record the vegetation regions of Europe as a whole.
3. Compare in climate and in vegetation the European and the African shores of the Mediterranean Sea.
4. Compare in climate and vegetation Russia in Europe with Russia in Asia, and Turkey in Europe with Turkey in Asia.

Climate regions. — The special characteristics of the climate of Western Europe have been noted in the preceding lesson: those of the European peninsulas which jut into the Mediterranean Sea are summarised in Chapter 12 on Winter Rain Regions. The rest of the continent comprises Russia and the States on the Lower Danube.

Climate of Inland Europe. — The table below gives climate values for six places in Europe which fall outside the region of winter warmth and also outside the region of winter rains. In nearly every case the heaviest rainfall occurs during the summer and autumn months; this illustrates the fact that rainfall swings with the sun (p. 34). When the belt of arid conditions swings northwards during the months May-July the rain belt just to the north of this swings north also. Therefore the parts of Europe north of the regions which have dry summers receive rain during this season.

CLIMATE OF PLACES IN INLAND EUROPE.*

	MONTHS.												YEAR.
	1	2	3	4	5	6	7	8	9	10	11	12	
WARSAW.													
T.	28	30	35	44	54	61	66	65	57	47	37	30	46
P.	7	3	7	5	-5	-8	-8	-5	2	3	--	2	2
R.	1	1	1	1	2	3	3	3	2	2	1	1	21
VIENNA.													
T.	30	35	43	52	60	70	70	70	62	53	43	35	52
P.	15	8	-3	5	5	8	3	-1	3	4	4	10	2
R.	2	2	2	2	3	3	3	3	2	2	2	2	28
BELGRADE.													
T.	30	33	45	55	63	70	75	74	65	55	43	37	54
P.	15	8	4	8	8	8	3	-4	3	7	4	11	1
R.	2	1	2	2	3	3	3	2	2	3	2	2	27
PERM.													
T.	3	5	20	34	52	61	66	65	50	37	22	12	36
P.	10	10	-	3	8	15	22	16	-4	3	8	8	-2
R.	-	-	-	-	2	3	2	2	2	1	1	--	12
MOSCOW.													
T.	12	12	22	37	52	63	65	64	52	40	30	17	39
P.	8	8	5	3	8	11	15	11	1	3	--	-3	-2
R.	1	1	1	1	2	2	2	2	2	1	1	1	17
ODESSA.													
T.	30	30	37	50	63	70	74	73	64	53	43	33	52
P.	12	8	4	3	8	8	12	8	3	12	8	10	1
R.	1	1	1	1	2	2	2	1	1	1	1	1	15

* See explanation of numbers on p. 82.

But in the winter the area included in the neighbourhood of the six selected places experiences very cold temperatures, when it is frequently too cold for any precipitation of moisture, thus the places named have smaller rainfall during the months when the temperature is very low. It is noticeable also that during the rainy period there occurs a low pressure. If the range of temperature of these places be compared with the range of places on the coast of Europe it will be found that the inland places have a much greater range; e.g. the range at Aberdeen is 20° F., at Moscow it is 53° F.

The climate of Perm should be compared with those of Omsk (p. 173) and Fort Churchill (p. 233).

Vegetation regions.—Along the shore lands of the Arctic Ocean lies the **tundra** or cold desert; south of this in Scandinavia, Finland and Northern Russia occur the **cold forests**, which correspond in position to the cold forests of Northern Siberia and of Canada, north of the Great Lakes. South of the forest belt the land is of two kinds, to the east in Southern Russia lie the **grass-lands**, the steppes of Russia; to the west lies a region of somewhat indefinite character; it is mainly a region of **mixed wood and grass land**, but in the extreme south of the continent partakes of the special vegetation characteristics of the Mediterranean or **winter rain region** (p. 48). If Europe be divided into three parts, Peninsula Europe, Western Europe, and Northern and Eastern Europe, so that the last mentioned part is roughly bounded to the west by the line from Odessa to Venice and thence to Danzig, it would appear that Western Europe, which is comparatively very narrow, is the region of mixed wood and grass land.

CROPS IN WESTERN EUROPE.

	Million Bushels					Million Cwts		
	Wheat	Oats	Barley	Rye	Maize	Sugar Beets	Tobacco	Potatoes
England	53	88	47	—	—	—	—	49
Wales	1	6	3	—	—	—	—	2
Scotland	2	34	8	—	—	—	—	18
Ireland	1	50	7	—	—	—	—	53
United Kingdom }	57	178	65	2	—	—	—	122
Belgium	14	43	4	20	—	32	0.1	46
France	330	300	40	48	21	108	0.4	270
Germany	133	565	143	357	—	259	0.6	880
Holland	5	22	4	13	—	28	0.1	27
Denmark	4	50	23	17	—	8	—	20
Total	543	1158	309	455	21	435	1.2	1365
World percentage }	17	32	26	29	1	—	6	—

Farming in Western Europe. The above table shows that Western Europe produces about one-sixth of the world's wheat,

almost one-third of the oats and rather more than one-fourth of the barley and rye; as well as extensive crops of sugar beets and potatoes. France leads in the quantity of wheat produced, but Germany is first in the production of rye and oats. The three smaller countries have a comparatively large production of cereals, especially those—rye and oats—which grow in a colder, moister climate.

The districts which grow these crops best in proportion to area are shown in Fig. 97, where the wheat belt can be distinguished lying between lat. 50° and 55° N. Rye and oats are best grown in the colder districts which lie near to the wheat belt, districts which are colder by reason either of their higher latitude or of greater elevation.

These crops, except maize, are not grown extensively in the south of France where the climate is that of winter rains. (Chapter 12.)

FARM ANIMALS IN WESTERN EUROPE (Millions).

	Horses	Cattle	Sheep	Pigs
England	1.2	5.0	15.3	2.2
Wales	0.2	0.7	3.7	0.2
Scotland	0.2	1.2	7.2	0.1
Ireland	0.0	4.8	3.8	1.3
United Kingdom	2.2	11.7	30.0	3.8
Belgium	0.3	1.8	0.2	1.2
France	3.2	14.1	17.5	7.1
Germany	4.4	20.6	7.7	22.2
Holland	0.3	2.0	0.9	1.3
Denmark	0.5	1.8	0.9	1.5
Total	10.9	52.0	57.2	37.1
World percentage	13	12	10	27

Except in the case of pigs Western Europe does not rear so many animals as cereals in proportion to the rest of the world. Horses, cattle and sheep only amount to about one-eighth or one-tenth of the world's flocks and herds. Fig. 97 shows that the cattle are more numerous on the wetter parts of the lowlands,

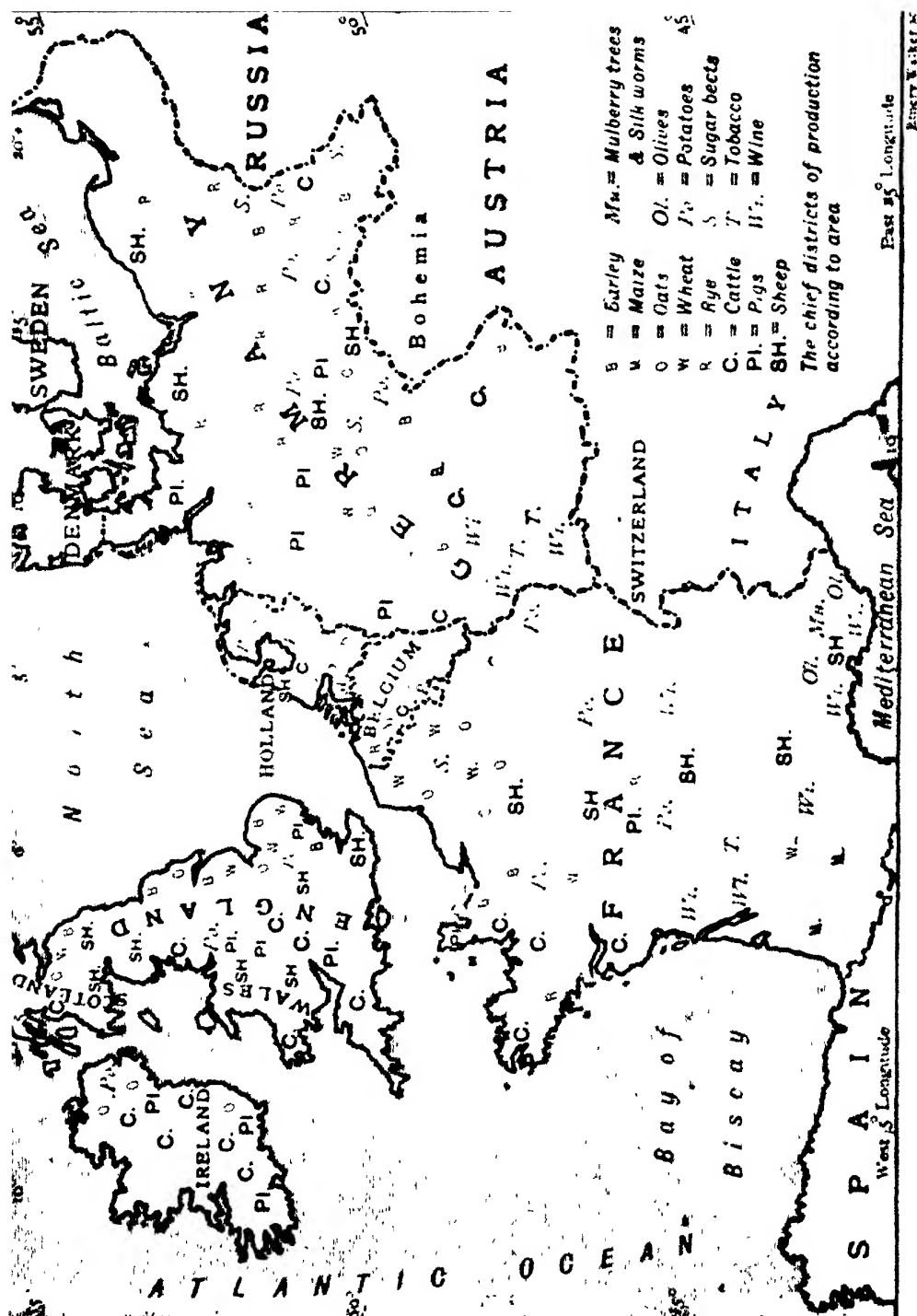


FIG. 97.—FARMING IN WESTERN EUROPE

and the sheep abound on the uplands of England, Wales, Southern Scotland, Central France and Saxony, while there is, comparatively, a large number of sheep on the German shore lands of the Baltic Sea.

Half the sheep of Western Europe are in the British Isles. Continental Western Europe affords a good illustration of the tendency which arises in countries where the land is used extensively for arable farming for the cereals to be grown at the expense of the flocks and herds. The climate of the British Isles, with its greater humidity and its consequent greater proportion of pasture land, sustains a greater proportion of animals. This is in striking contrast with the condition of affairs in Australia where rearing flocks of sheep is the main business of the agriculturist. America occupies an intermediate position, as the growth of cereals is accompanied by extensive ranching operations (Fig. 85).

(Except Greece, Portugal, Turkey, etc.)

	Million Bushels					Millions			
	Wheat	Oats	Barley	Rye	Maire	Horses	Cattle	Sheep	Pigs
Russia (European)	400	740	280	660	50	20.0	31.3	39.0	10.1
Finland	—	22	5	11	—	0.3	1.5	1.0	0.2
Austria	60	150	72	85	16	1.7	9.0	2.6	4.4
Hungary	163	81	63	44	170	2.2	7.1	8.1	5.7
Italy	164	18	8	4	91	1.0	6.0	11.2	2.5
Spain	116	24	69	25	20	0.5	2.3	14.5	2.1
Roumania	68	21	22	4	90	0.9	2.6	5.7	1.7
Bulgaria	31	9	10	5	17	0.5	1.8	8.1	0.5
Servia	11	3	3	1	19	0.2	1.0	3.2	1.0
Switzerland	4	2	—	1	—	0.1	1.5	0.2	0.5
Norway	—	8	2	1	—	0.2	1.0	1.4	0.3
Sweden	6	77	15	22	—	0.6	2.6	1.0	0.9
Total	1023	1155	549	863	473	28.2	67.7	96.0	29.9
World percentage	32	32	45	55	13	31	15	17	20

Farming elsewhere in Europe.—The grass-lands of the rest of Europe are great growers of cereals, as they grow roughly twice as
w.g. u

much wheat, barley and rye, and about the same quantity of oats as Western Europe. At the same time they rear about half as many sheep, twice as many horses, and rather more cattle than Western Europe. This is partly accounted for by the greater area of grass-land, especially in the case of **Russia** which produces about one-eighth of the world's wheat, one-fourth of the barley, one-fifth of the oats, two-fifths of the rye, and rears a large proportion of the world's domestic animals. In consideration of their size, **Hungary**, **Roumania**, and **Bulgaria** are extensive farming countries.

REST OF EUROPE. EXPORTS OF CEREALS. (Million Bushels.)

		Wheat.	Oats.	Barley.	Rye.
From :	To :				
Russia - -	Western Europe	57	42	71	19
	Rest of World -	33	8	9	8
	Total - -	90	50	80	27
Hungary - -	Western Europe	—	—	12	—
	Austria - -	19	13	10	9
	Total - -	19	13	22	9
Roumania - -	World - -	52	9	17	3
Bulgaria - -	.. - -	9	1	1	1
	Grand total -	170	73	120	40
Percentage of World production -		5	2	10	3

The four agricultural countries, **Russia**, **Hungary**, **Roumania** and **Bulgaria**, produce a surplus of wheat, barley, oats and rye, and supply the greater part of this surplus to Western Europe, as is shown in the above table.

The surplus production of Hungary is sent to Austria, except in the case of barley, this latter product being sent to the brewing towns of Germany.

Supplies of cereals in Western Europe.—In addition to the large quantities of cereals grown at home, and the imports from the

rest of Europe, Western Europe receives supplies of cereals from the great cereal-growers in other continents; this is particularly true in the case of wheat.

WESTERN EUROPE: IMPORTS OF CEREALS. (Million Bushels.)

		Wheat.	Oats.	Barley.	Rye.	Maize.
To :	From :					
United Kingdom	Russia -	19	16	17	0.9	8
	U.S.A. -	69	3	6	0.5	28
	Argentina -	45	8	—	—	40
	Br. Empire -	63	3	3	0.1	4
	Rest of World -	14	17	19	0.3	12
Total -		210	47	45	1.8	92
Germany	Russia -	20	18	52	15	6
	U.S.A. -	21	3	1	—	14
	Argentina -	13	—	—	—	11
	Rest of World -	27	7	21	4	8
Total -		81	28	74	19	39
France -	World -	9	18	5	—	13
Belgium -	„ -	45	10	10	1	10
Denmark -	„ -	3	2	—	4	15
Holland -	„ -	18	3	6	6	18
Grand Total -		366	108	140	31.8	187
Percentage of World Production -		11	3	12	2	5

Germany and the United Kingdom draw supplies from Russia, the United States and the Argentine Republic, while the United Kingdom also draws upon the agricultural resources of the British Empire.

France imports only a small quantity of cereals, as her home production is usually almost sufficient for her needs, but the three smaller countries all augment the home supply.

These facts are shown in the table which gives the net imports, as the smaller countries, Holland and Belgium, have an extensive transit trade from the sea-coasts to their larger neighbours.

ANIMAL PRODUCTS AND TRADE (WESTERN EUROPE).

	WOOL PRODUCTION.	EXPORTS.	IMPORTS.	BUTTER.	CHEESE.
	Million lbs.			Exports in million lbs.	
United Kingdom	133	34	702*	—	—
France - -	78	76	512	48	24
Germany - -	29	—	433	2	3
Belgium - -	—	—	132	—	—
Holland - -	—	31	38	55	106
Denmark - -	—	—	—	179	—
Total - -	240	141	1515	284	133

* 302 million lbs. are re-exported.

Animal products. In addition to the imports of meat by the various countries of Western Europe, as shown by the tables for the separate countries, **wool**, **butter** and **cheese** are produced and exported as shown in the above table.

The **United Kingdom** produces almost 5 per cent of the world's wool, and uses annually about 500 million lbs, *i.e.* about 18 per cent., while **France** and **Germany** use about the same quantity.

France, **Holland** and **Denmark** have large exports of **butter** and **cheese**. These countries export about $\frac{1}{10}$ million tons of butter between them, while **Russia** exports about $\frac{1}{2}$ million tons annually, chiefly from the districts of Barnaoul, Tomsk and Kurgan in **Eastern Siberia**.

SUMMARY.

1. In proportion to its size Western Europe has large crops of cereals.
2. The British Isles has many sheep.
3. Eastern Europe is predominantly agricultural.
4. Western Europe imports wheat, maize and wool largely.

QUESTIONS.

1. Describe and illustrate from the North-east and North-west corners of the Atlantic Ocean the conditions favourable to fishing industries.

(Newf.)

2. Point out how the climates of Newfoundland and Northern France differ so, seeing that these countries are in the same latitude. Explain the reasons of this, and show how this difference of climate causes the vegetable

productions and the occupations of the people in the two countries to be of so diverse a character. (Newf.)

3. To what extent are wheat, maize and oats grown in Europe? What are the special features of the climates suitable to the growth of each grain?

4. What constitutes a good *wheat* area? Prove your statements with special reference to such areas in North America and Europe. (L.U.)

55. Western Europe. Mining, etc.

1. Revise the chapter on coal, etc. (pp. 60-3).

2. Revise the chapter on the great ports of the world (pp. 64-6).

COAL AND IRON PRODUCTION IN EUROPE. (Million Tons.)

	Coal.	District	Iron Ore.	Pig-Iron.	Steel.	District.
United Kingdom	263	(See p. 334)	16	10	6	Sheffield, Birmingham, Glasgow
France	35	Valenciennes ($\frac{1}{2}$), St. Etienne	9	3	2	Briey, Nancy
Germany	205	Dortmund ($\frac{1}{2}$), * Breslau, Bonn	27	12	11	Dortmund, Bonn, Alsace
Belgium	24	Mons, Charleroi	—	1	2	Liege, Namur
Austria	40	—	3	1	1	Styria, Bohemia
Hungary	7	—	2	1	—	—
Italy	—	—	1	—	—	Elba
Russia	22	Donetz valley	5	3	2	Marinpol, Yuzovka
Spain	4	—	10	—	—	Biscay province (Bilbao)
Sweden	—	—	5	1	—	Dannemora

Coal Mining.—In Western Europe coal is widely distributed but the greatest quantities are mined in the United Kingdom and in Germany. The German coalfield in the district round **Dortmund** is continued into **Belgium** and across into the North of France near **Valenciennes**.

The iron industry tends to be located on or near the coalfields, e.g. the great iron industries of Germany and Belgium are on the Dortmund-Mons coalfield.

The **United Kingdom** mines one-fourth of the coal, one-eighth of the iron ore, and makes one-fifth of the pig-iron and one-eighth of the steel of the world.

Germany mines about one-fifth of the coal, one-fifth of the iron ore, and makes about one-fourth of the pig-iron and steel of the world.

Belgium, in proportion to its size, has a great iron industry.

OTHER MINERAL ORES: PRODUCTION IN EUROPE.
(Thousand Tons.)

	Copper	District	Lead	District	Zinc	District
France	—	—	13	—	49	Malmes
Germany	750	Mansfeld	152	Königshütte	700	Silesia
Belgium	—	—	—	—	3	Moresnet
Austria-Hungary	17	—	23	Bleiberg	31	—
Italy	157	—	42	Sardinia	158	Sardinia
Russia	13	Perm	—	—	30	—
Spain	3035	Andalusia	274	Linares	182	—
Sweden	21	Falun	2	Sala	50	—
Norway	40	Roros	—	—	—	—

Also: Platinum from Perm (Russia), Manganese from the Caucasus (Russia), Petroleum from Baku (Russia).

Other ores.—**Copper** is extensively mined in Spain and Germany, **lead** and **zinc** in the same countries, while the island of Sardinia mines lead and zinc.

Russia has extensive mines of platinum and manganese, as well as most important **petroleum** works in the district of **Baku**.

Communications.—Germany, France and Western Europe generally have an extensive system of **waterways**. From the **Seine** to the **Rhine** on the lowland is a system of canals which serve for traffic in heavy goods.

Across the narrow isthmus from the North to the Baltic Sea is the **Kaiser-Wilhelm Canal**, through which passes annually about 6 million tons of shipping, the major portion of which flies the German flag. The German rivers are canalised usually as far as the southern boundary of Germany, and from **Hamburg** on the Elbe, and past the German frontier at **Emmerich** on the Rhine, about 20,000 boats travel annually in each direction.

Berlin is well served by canals which connect the navigation of the Oder with that of the Elbe, and has almost as great a traffic as Hamburg.

Railway communications are shown on the map (Fig. 98).

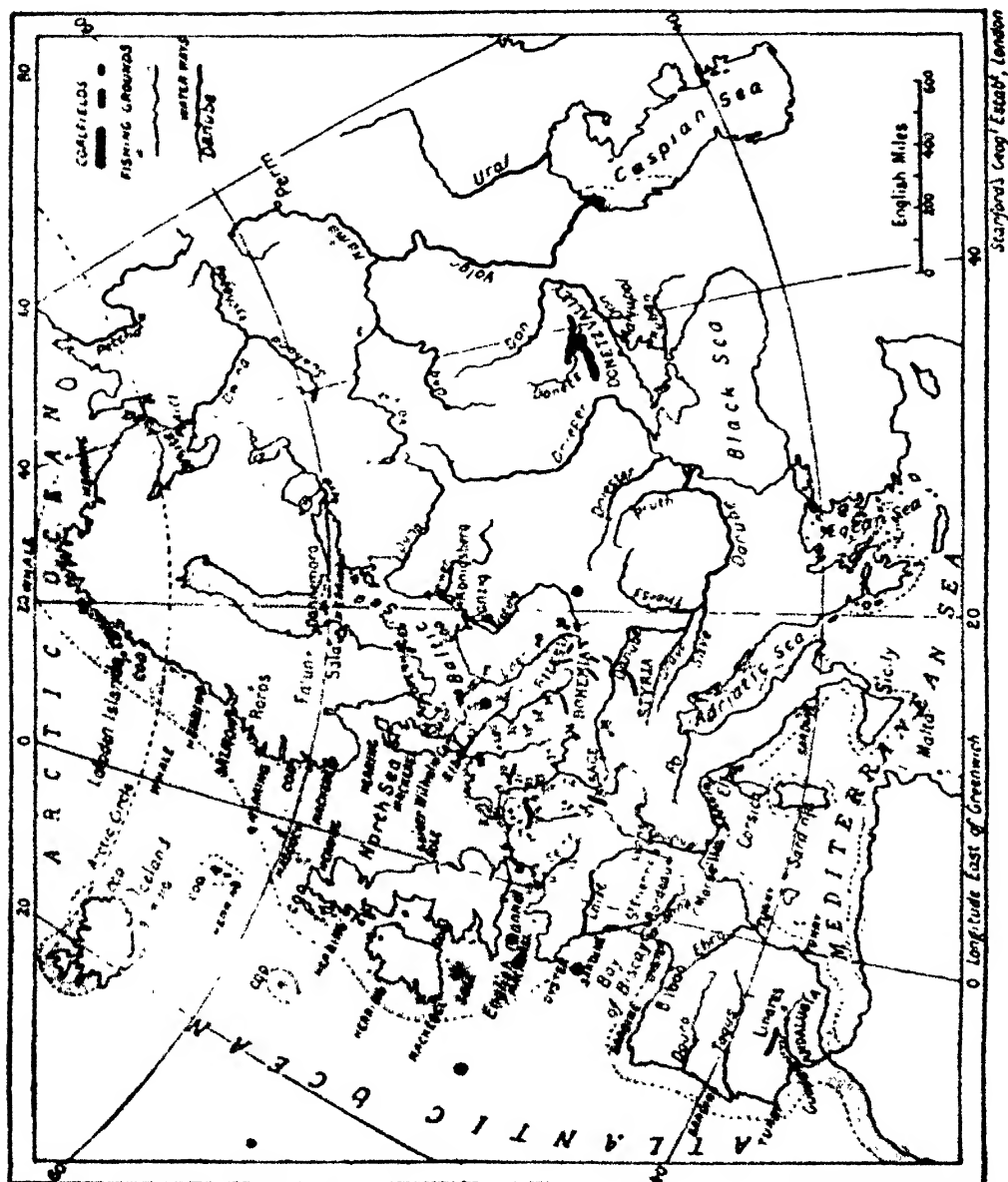


FIG. 98.—EUROPE: COMMUNICATIONS.

- | | | | | |
|---------------|-------------------|-----------------|----------------|------------------|
| 1. Amsterdam. | 9. Dieppe. | 17. Liège. | 25. Nancy. | 33. Mansfeld. |
| 2. The Hague. | 10. Havre. | 18. Bleiberg. | 26. Bremen. | 34. Leipzig. |
| 3. Rotterdam. | 11. Rouen. | 19. Emmerich. | 27. Hamburg. | 35. Dresden. |
| 4. Antwerp. | 12. Paris. | 20. Dortmund. | 28. Hanover. | 36. Nürnberg. |
| 5. Brussels. | 13. Valenciennes. | 21. Dusseldorf. | 29. Rostock. | 37. Frankfurt. |
| 6. Dunkirk. | 14. Mons. | 22. Cologne. | 30. Stettin. | 38. Munich. |
| 7. Calais. | 15. Charleroi. | 23. Bonn. | 31. Berlin. | 39. Königshütte. |
| 8. Boulogne. | 16. Namur. | 24. Briey. | 32. Magdeburg. | 40. Breslau. |

From **Paris**, **Cologne** and **Berlin** on the lowland lines radiate in all directions. They pass the Pyrenees on the west, and go through the Alps by the tunnels shown in Fig. 91.

Fisheries.—In the North Sea and off the coast of Norway are extensive fishing grounds. From these the **United Kingdom** obtains annually about 3 million pounds worth of **herrings**, 2 million pounds worth of **haddocks**, and about $1\frac{1}{2}$ million pounds worth of **cod**. **Holland** receives about 1 million pounds worth of herrings, and **Norway** gets about 1 million pounds worth of cod and about $\frac{1}{2}$ million pounds worth of herring.

WESTERN EUROPE: TRADE.

	Value in £1000	Imports (Percentages)
France	233	Coal (7), raw cotton (7), cottons (1), silk (6), timber (3), wool (10)
Germany	400	Coal (2), cottons (2), grain (10), silks (2), timber (3), wool (4), woollens (1)
Holland	220*	Coal (3), grain (15), iron and steel goods (4), timber (3), copper (5)
Belgium	140*	Coal (3), grain (15), timber (4), wool (5), flax (3)
Denmark	41	Coal (6), iron and steel goods (6), grain (8), timber (4)
		Exports (Percentages)
France	211	Cottons (6), iron and steel goods (3), silks (6), woollens (4), wine (4)
Germany	320	Chemicals (9), coal (5), cottons (6), iron and steel goods (11), machinery (6), sugar (3)
Holland	179*	Grain (6), butter (1), sugar (2), iron and steel goods (2), copper* (5)
Belgium	108*	
Denmark	23	Coal (4), flax (4), grain (6), iron and steel goods (9), linens (4), zinc (4), meat (24), butter (40)

* Much of this trade appears in both imports and exports, as it is transit trade to Germany and France mainly.

Trade.—The total trade of the **United Kingdom** is about 1,100 million pounds per annum (p. 344).

Germany has a trade equal to about three-fourths of this and **France** about one-half. The smaller countries have a trade which appears large in the above table, but much of it is transit trade for France and Germany.

The imports are usually coal, grain, cotton, wool and timber, *i.e.* food-stuffs and raw materials for manufacture.

The exports of Holland and Denmark are largely food-stuffs, while those of France, Germany and Belgium are largely manufactured goods.

The details of the trade with other countries is shown in the trade tables in the next two chapters, but all countries have an extensive coasting trade.

Coasting trade of France.—As an example of this coasting trade the table below is important.

COASTING TRADE OF FRANCE (Percentages).

	Million cwt.	CHIEF PORTS.	CHIEF ARTICLES.
From Dunkirk	6	To Marseilles (24), Brest (19)	Sugar (18), coal (25)
To ..	2	From Bordeaux (37), Marseilles (11)	Iron goods (22), grain (15), wine (11)
From Havre	6	To Rouen (50)	Oil (14), rice (8), wine (8)
To ..	4	From Rouen (32), Cherbourg (10)	Building materials (25),
From Nantes	2	To Brest (14), Bordeaux (14)	Grain (14)
To ..	4	From Dunkirk (10)	Coal (30), wine (10)
From Bordeaux	8	To Pauillac (50)	Minerals (25), wine (23)
To ..	8	From Dunkirk (8)	Building materials (24)
From Marseilles	8	To Nice (10)	Grain (15), coal (15)
To ..	8	From Dunkirk (20)	Chemicals (11), wine (9)

The trade here mentioned between Havre and Rouen, and from Bordeaux to Pauillac, is local along a river estuary.

The bulk of the coasting trade is in heavy articles, which are not likely to deteriorate by the slow transit by sea.

An instance of coasting trade occurs in connection with this book, which is printed in Glasgow and is then sent by sea to London to be bound and published.

Ports.—Antwerp furnishes an illustration of a canal and sea-port in Western Europe.

Antwerp has a large trade with the United Kingdom, the United States and Argentina by sea, as well as a large trade with Germany by canal.

TRADE OF ANTWERP (Percentages).

By sea from Germany (1), U.S.A. (13), Argentina (12), United Kingdom (14)

By canal from Germany (11)

EXPORTS.

By sea to Germany (2), U.S.A. (4), Argentina (5), United Kingdom (15)

By canal to Germany (18)

Rotterdam, at the mouth of the Rhine, illustrates how the river traffic of the Rhine makes Rotterdam a greater port than Amsterdam

DUTCH PORTS.

	SHIPS IN THOUSANDS.		
	In.	Out.	
Rotterdam	8	7	British, German, Danish, Swedish, Norwegian.
Amsterdam	2	1	

Of the German ports Hamburg has the largest trade, and this again is partly due to the greater traffic of the Elbe river in comparison with that of the Oder.

The **hinderland** of Rotterdam extends up the Rhine basin, that of Hamburg includes the basin of the Elbe and part of that of the Oder.

GERMAN PORTS.

	SHIPS IN THOUSANDS.			SHIPS IN THOUSANDS.	
	In.	Out.		In.	Out.
Hamburg	13	15	Rostock	2	2
Stettin	5	5	Danzig	3	3
Bremen	2	2	Königsberg	2	2

French ports.—**Marseilles** and **Havre** are the great French sea-ports, while **Paris** is a great river port on the Seine, and has much traffic by barge from the north-east into the Seine. Boulogne and Dieppe have a large trade mainly with the United Kingdom by means of the ferry steamers which cross the English Channel.

FRENCH PORTS: CHIEF ARTICLES OF TRADE.

	Total trade in £100.	Imports.*	Exports.*
Marseilles.	67	Cereals (33), timber (20)	Cereals (20), oils (80), sugar (33).
Havre	63	Raw cotton (76), coffee (40), copper (75), coal (20), rice (33).	Cotton goods (75).
Paris	46	Cocoa (10), cocoa (50), coffee (33).	Sugar (25).
Dunkirk	32	Wool (50), nitrate (70), timber (40).	Sugar (25).
Bordeaux	23	Fish (50).	Wine (40), timber (40).
Boulogne	12	General.	General.
Dieppe	7	General.	General.

* (70), etc., indicate percentages of French imports or exports of the commodity.

TRADE OF COPENHAGEN.*

IMPORTS.		Per- centages.
live animals	from Sweden, Russia	70
Meat	„ U.S.A., Iceland, Sweden	98
Fish	„ Norway, Sweden	50
Cereals	„ Russia, Germany, U.S.A.	40
Sugar	„ Germany, United Kingdom	90
Coal	„ United Kingdom	90
Iron and steel goods	„ Germany, United Kingdom, Belgium	50
EXPORTS.		
Pigmeat	to United Kingdom	14
Butter	„ United Kingdom, Germany	37
Wheat	„ Sweden	80
Wheat flour	„ Norway, Russia	100
Barley	„ Germany, Norway	5

* There is a considerable amount of entrepôt trade in miscellaneous goods with Norway, Sweden and Germany.

Copenhagen.—The chief port of Denmark is **Copenhagen**, which has a large entrepôt trade with Scandinavia and Germany in addition to the trade in food-stuffs shown in the above table.

WESTERN EUROPE: TOWNS.

Town.	Population in millions.	Town.	Population in millions.
Paris	2.8	Frankfort-on-Maine . .	0.3
Marseilles	0.5	Nurnberg	0.3
Lyons	0.5	Dusseldorf	0.3
Bordeaux	0.3	Hanover	0.3
Berlin	2.0	Copenhagen	0.4
Hamburg	0.8	Brussels	0.6
Munich	0.5	Antwerp	0.3
Dresden	0.5	Amsterdam	0.6
Leipzig	0.5	Rotterdam	0.4
Breslau	0.5	The Hague	0.3
Cologne	0.4		

Towns. --The great towns of Western Europe are London (p. 347), Berlin and Paris. Hamburg is about the same size as Liverpool and is a large port (p. 9).

In addition to the ports of Marseilles, Bordeaux, Copenhagen, Rotterdam and Antwerp, the large towns are Lyons on the Rhone, Munich, Dresden, Leipzig and Breslau in Germany.

SUMMARY.

1. Western Europe mines coal in Britain, Belgium, etc.
2. Western Europe has an extensive and closely connected system of waterways.
3. All countries with sea-coasts have a coasting trade.
4. The North Sea is a fishing ground.
5. London, Paris and Berlin are great towns.

56. Mediterranean Europe.

1. Revise the work on Algeria, Morocco and Egypt.
2. Revise Chapter 12 on Winter Rains.
3. Revise the work on the Suez Canal (pp. 65, 117, 147).
4. What proportions of the world's cereals and domestic animals are produced in Spain and Italy? (pp. 69, 71).

Size. --Mediterranean Europe consists of the three peninsulas of (Portugal and Spain), Italy, and **Balkan** (Greece, Servia,

Bulgaria and Turkey in Europe). **Spain** is the largest country, but **Servia**, which is the smallest, is the most densely peopled.

AREA : POPULATION.

	Area in thousand sq. miles.	Population in millions.	Density per sq. mile.	Percentage Agriculture.	Population dependent on Industry.
Portugal	35	5	155	36	1
Spain	195	20	100	—	—
Italy	111	34	111	29	10
Greece	25	3	105	—	—
Servia	19	3	158	70	5
Bulgaria	38	4	101	—	—
Turkey*	65	6	93	—	—

* In Europe only.

The table above shows that only in **Italy** is there any great number of people dependent upon industrial pursuits; the number is about three millions, and making allowance for the families which are dependent upon the actual industrial workers this means that there are in Italy about one and a half million industrial workers.

Relief.—The Iberian Peninsula is mainly upland, with the most extensive lowland in the valley of the **Ebro**. The **Pyrenees** form the Northern boundary of the upland, and they are impassable except at the ends. The western end is almost in a straight line from Paris to Madrid.

Italy contains the lowland of the Plain of **Lombardy**, across which runs the river **Po**; in some respects this lowland at the southern foot of the Alps resembles the Indo-Gangetic Plain at the foot of the Himalayas. The **Apennines** form a continuation of the Alps towards the south-east and have on each side a coastal sill. This line of mountains is continued by way of **Sicily** and **Malta** to connect with the Atlas Mountains of North Africa (p. 158).

Balkania consists of mountains with radiating valleys, the chief of which is that of the **Maritza**. The upland reaches close to the shore of the **Adriatic Sea** on the west, so that there is practically no coastal sill.

Climate.—The climate of these peninsulas is characterised by winter rains (Chapter 12); so that there are hot dry summers and wet cool winters. In the west the rain tends to fall mostly in the

late autumn and the early winter ; further east the rain falls later in the year.

Farming.—Some details about the farming on the shore lands of the Mediterranean Sea have been considered in connection with the rest of Europe in Chapter 54. Other facts have been given in Chapter 49 with regard to Africa.

Wheat, maize, tobacco, are produced in Italy and the South of France, together with **olive oil** from olive trees, and **mulberry leaves**. On the latter are fed the **silk worms** from which is obtained the raw silk which is the basis of the silk industry of France, Italy and Switzerland. Oranges, lemons, currants, raisins, figs are also grown for home consumption and export, while wine is produced largely for home use.

Farming occupies the attention of the majority of the people, many of whom are able to live in very poor circumstances since the climate does not force them to spend much upon food, clothes and houses.

Industries.—Mining is developed in **Spain** and **Italy**, but only in Italy is there any great **textile industry**. The other countries are forced to obtain their supplies of woven fabrics from abroad, and all countries depend upon other countries for their supplies of iron and steel goods and machinery. The Mediterranean lands are therefore agricultural lands.

MEDITERRANEAN EUROPE : IMPORTS.

Country.	Total Value in £100.	CHIEF ARTICLES (Percentages).
Portugal*	14	Wheat (9), iron goods (7), cottons (6), coal (6), fish (6).
Spain	38	Raw cotton (13), wheat (10), coal (7), iron goods (5), fish (3).
Italy	97	Raw cotton (11), coal (10), wheat (5), iron goods (2).
Greece	6	Grain (26), coal (5), cottons (7), woollens (4).
Servia	3	Cottons (17), woollens (4).
Bulgaria	5	Cottons (20), iron goods (8), timber (3), woollens (3).
Turkey†	26	Sugar (10), rice (5), flour (5), linens (5), woollens (3).

* Included here for convenience.

† The whole Turkish Empire.

Imports.—The above table of imports shows that the Mediterranean lands except Servia and Bulgaria do not supply themselves

with sufficient wheat and grain for their own use. Except Italy they import cotton and woollen goods, and most of them import coal. Spain and Portugal import large supplies of **fish**, which, on religious grounds, is a staple article of diet.

The Turkish Empire, of which the major portion is in Asia Minor, largely imports food-stuffs, sugar and rice, and textiles.

MEDITERRANEAN EUROPE: EXPORTS.

Country.	Total Value in £10 ⁶ .	CHIEF ARTICLES (Percentages).
Portugal*	7	Wine (32), cork (14), fruits and vegetables (4), copper (4).
Spain	37	Iron ore (11), copper (7), lead (8), wine (7), oranges (7), cork (5).
Italy	74	Raw silk (25), cottons (5), silk goods (5), olive oil (3), fruits (3).
Greece	5	Currants (3.9), lead ore (5), iron ore (6), olive oil (5), wine (5).
Servia	3	Prunes (16), maize (10), wheat (15), barley (5).
Bulgaria	5	Wheat (34), maize (12), barley (4), rye (5).
Turkey†	16	Silk (10), figs (5), mohair wool (5), coffee (5).

* Included here for convenience

† The whole Empire.

Exports.—Spain, Portugal and Greece export **metallic ores** and **wine**. Bulgaria and Servia export **maize**, **wheat** and **barley**, while the other countries export large quantities of **fruits** such as oranges, lemons, currants, in addition to **olive oil**.

The Turkish Empire exports silk, figs, coffee and mohair wool.

Trade.—The chief countries of Western Europe, France, Germany and the United Kingdom take from one-third upwards of the trade of the Mediterranean lands.

Germany is the most important of the three competitors in the trade with **Servia**, otherwise, except in the case of the exports from Italy, the United Kingdom has the greater share of the trade.

The position of the **United Kingdom** in the trade of the Mediterranean is profoundly affected by two facts: first, the export of coal from the United Kingdom, and second the preponderance of British ships which pass through the Mediterranean Sea and call at Mediterranean ports on their way to the Suez Canal.

Italy is the only country which has an extensive trade across the Atlantic Ocean to the United States and to the Argentine Republic. Many **Italians** emigrate to **Argentina**, where they help considerably in the farming operations, usually with the intention of returning home when they have made money.

TRADE OF MEDITERRANEAN EUROPE (Percentages).

	With	United Kingdom.	Germany.	France.	Rest of Mediterranean Europe.	Elsewhere.*
To Portugal	-	27	16	11	7	39
From „	-	25	8	—	16	51
To Spain	-	18	9	17	6	50
From „	-	30	6	19	9	36
To Italy	-	18	18	9	1	54†
From „	-	8	15	12	1	64
To Greece	-	17	9	7	8	59
From „	-	26	9	6	1	58
To Servia	-	10	28	2	4	56
From „	-	3	30	4	6	57
To Bulgaria	-	16	15	5	4	60
From „	-	12	10	5	6	67
To Turkey	-	50	6	12	14	28
From „	-	23	4	18	8	47

* Largely with Austria-Hungary, Russia and Turkey.

† Partly with United States and Argentine.

The tables of imports and exports give the total trade of the countries named at about 350 million pounds, which is about as much as the total export trade of the United States alone (p. 267) and is less than the total trade of Germany (p. 312).

Towns.—The effect of the lack of industrial workers is shown by the small number of large towns there are in the Mediterranean region. After Constantinople, three Italian towns, **Rome**, **Naples** and **Milan**, head the list as regards population, then two Spanish towns, **Madrid** and **Barcelona**, **Lisbon** in Portugal, three other Italian towns, **Turin**, **Palermo** and **Genoa**. **Constantinople** alone has over a million inhabitants; this is due to its position on the narrowest sea-division between Europe and Asia, on a route which has been used for traffic for centuries, and to the fact that it is the capital of the Moslem Empire.

MEDITERRANEAN EUROPE: TOWNS.

TOWN.	Population in millions.	TOWN.	Population in millions.
Lisbon - -	0.4	Palermo - -	0.3
Madrid - -	0.5	Genoa - -	0.3
Barcelona - -	0.5	Athens - -	0.2
Naples - -	0.6	Belgrade - -	0.1
Milan - -	0.6	Sofia - -	0.1
Rome - -	0.6	Constantinople -	1.2
Turin - -	0.4		

The number of towns in this list which are in Italy points to the effect of industry—Milan is a centre of the silk trade—and to the effect of trade, since Naples is a great port.

There is only one large town in France on the Mediterranean Sea—Marseilles—which is about the same size as Madrid.

British possessions.—The sea route to India through the Mediterranean Sea has made it necessary for Britain to hold **Gibraltar** and **Malta** as coaling stations at the entrance and half-way through this great waterway. Both places link up India and Australasia by way of Aden (p. 65) with the Mother Country.

SUMMARY.

1. Mediterranean Europe has wet cool winters.
2. Mediterranean Europe is largely agricultural, and produces grain, fruits and raw silk.
3. Constantinople is the largest town.
4. Italy has the largest number of large towns, in consequence of its industries and shipping.
5. Gibraltar and Malta are British possessions, and are coaling stations.

57. Northern and Eastern Europe.

1. Tabulate the cereal produce and the animals of Russia, Roumania and Austria-Hungary (pp. 69-71).

2. Describe briefly the climatic and vegetation conditions which you would meet in passing from the Arctic Ocean across Russia to the Black Sea.

3. What is Norway's share of the fishing industry of Europe?

Size.—Northern and Eastern Europe consists of the eastern part of the Great European Plain, with the peninsula of **Scandinavia** and the Alpine land of **Switzerland**.

AREA : POPULATION.

	Area in thousand sq. miles.	Population in millions.	Density per sq. mile.	PERCENTAGE POPULATION DEPENDENT ON	
				Agriculture	Industry.
Russia	2052	125	61	—	—
Roumania	51	7	130	—	—
Austria	110	28	250	50	25
Hungary	125	21	168	66	13
Switzerland	10	4	208	25	13

Russia predominates in size and has a sparse population ; **Switzerland** forms a contrast with a small size and dense population.

Austria contains the largest proportion of people dependent upon industry, about seven millions, of whom probably about two millions are actually engaged in industrial pursuits.

Relief. Most of the area of **Russia**, **Roumania** and **Hungary** is lowland, while Switzerland and Austria include many of the valleys of the **Alps**. Scandinavia consists of a high plateau in **Norway**, with a steep face towards the Atlantic Ocean and a gentler slope to the Baltic Sea, most of which is in **Sweden**.

Climate.—Most of this area has a January temperature below freezing point, while in July the temperature is high. It is thus characterised by the great range of temperature of which the most striking example is in Western Siberia, just beyond the European boundary.

The rainfall is slight and falls at all seasons.

Vegetation.—Along the Arctic shores there occurs the **tundra** ; south of this, stretching across the continent from Sweden to the Ural Mountains, is the belt of the temperate **forests**, and south of this again, from the Urals to Hungary, lies the **grass-lands** largely known as **steppes**. Austria, being mountainous, is wooded on the lower slopes.

Consequently the people are largely lumberers, or farmers. The lumberers in Norway, Sweden and Russia provide timber, wood pulp for paper-making, turpentine, wood-tar, and send it abroad by way of the Baltic Sea. Much of these products is floated down the

rivers of the lowlands, either in rafts or on barges, to the markets and the Baltic ports.

Industry.—**Sweden** has timber industries and exports manufactured wooden articles for buildings. **Russia** has some mineral industries in the south in connection with the iron mines, and has at **Baku** one of the large petroleum industries of the world.

Switzerland is one of the comparatively important manufacturing countries; the numerous waterfalls provide power for the driving of factory machinery by electricity, so that the country produces **watches** and **cotton** goods in addition to the silk goods which are made from the silk obtained from the neighbouring lands of France and Italy, where the silk worm is cultivated.

NORTHERN AND EASTERN EUROPE: EXPORTS.

COUNTRY	Total Value in £1000	CHIEF ARTICLES (Percentages).
Norway . . .	12	Wood pulp (15), timber (20), codfish (23)
Sweden . . .	28	Wood pulp (10), timber (32), butter (6), iron ore (6), non and iron goods (10)
Russia . . .	113	Grain (39), petroleum (3), eggs (5), butter (5), timber (10)
Roumania . . .	21	Wheat (42), maize (20), barley (9)
Austria Hungary	100	Sugar (8), lignite (4), eggs (4), timber (10), barley (2)
Switzerland . .	44	Cheese (5), condensed milk (3), cottons (16), silks (16), watches (14)

Exports.—**Norway** and **Sweden** specialise in timber and wood pulp, while Norway exports large quantities of **fish** and Sweden exports **iron ore** and iron goods.

Russia is a great exporter of cereals, and sends large quantities of **butter** abroad. This butter is mainly produced in Western Siberia, and has been the result of the establishment of a system of refrigerating cars on the Trans-Siberian Railway.

Roumania resembles Servia and Bulgaria in its dependence upon its cereals for its export trade.

Austria supplies Hungary with manufactures, etc., and Hungary supplies Austria with food stuffs, so that the Dual Monarchy only exports sugar, brown coal or lignite, and timber.

Switzerland is noted for its Alps, or mountain pastures; hence the export of **cheese** and **condensed milk** in addition to the manufactures of **cottons**, **silks** and **watches**.

NORTHERN AND EASTERN EUROPE: IMPORTS.

COUNTRY.	Total Value in £10 ⁶ .	CHIEF ARTICLES (Percentages).
Norway . . .	20	Grain (16), coal (7), woollens (3), iron and steel goods (12)
Sweden . . .	36	Coal (10), raw cotton (6), grain (4), iron and steel goods (10), woollens (5)
Russia . . .	87	Machinery and metal goods (7), woollens (3), coal (4), raw cotton (10)
Roumania . .	17	Woollens (6), iron and steel goods (10), cottons (10), coal (2)
Austria-Hungary	100	Coal (6), raw cotton (10), machinery (4), raw wool (5)
Switzerland .	64	Raw silk (10), grain (8), coal (5), raw cotton (4), cotton goods (7), woollens (5)

Imports.—All the countries named in the table require Most of them import **metal goods**, chiefly of iron and steel. Austria-Hungary imports raw wool and raw cotton for her domestic manufactures, while Switzerland imports silk for her manufacture of silk goods which are exported later.

The three colder countries Norway, Sweden and Russia import **woollen goods**.

TRADE OF NORTHERN AND EASTERN EUROPE (Percentages).

	With	United Kingdom.	Germany.	France.	Rest of Region.	Elsewhere.
To Norway . . .	-	28	^b 26	2	21	23
From „ . . .	-	38	15	4	9	34
To Sweden . . .	-	25	36	3	8	28
From „ . . .	-	34	20 ^b	7	11	28
To Russia . . .	-	13	38	3	12	34
From „ . . .	-	22	28	7	8	35
To Roumania . .	-	14	24	5	30	27
From „ . . .	-	16	10	7	8	59 ^a
To Austria-Hungary	-	9	39	3	10	39
From „ . . .	-	9	50	3	8	30
To Switzerland .	-	6	32	21	^a 10	31
From „ . . .	-	16	24	12	9	39

^a Largely to Belgium.

Trade.—**Germany** has the larger share proportionately of the trade with Russia, Austria-Hungary and Switzerland, as well as of the imports into Sweden.

The **United Kingdom** is the largest dealer with Norway, receives the larger share of Swedish exports, and has a greater trade than France with all the countries except Switzerland.

Belgium receives a large share of the grain exports of Roumania.

Except in the case of Roumania more than half the total trade of the countries of Northern and Eastern Europe is with France, Germany and the United Kingdom.

From the tables of imports and exports it will be seen that the total trade of the countries named is about 630 million pounds per annum, which is about eight ninths of the total trade of Germany (p. 312), about two-thirds of the total trade of the United Kingdom (p. 347), and a little larger than the total trade of the United States (p. 267).

NORTHERN AND EASTERN EUROPE: TOWNS.

Town.	Population in millions.	Town.	Population in millions.
Christiania . .	0.2	Kiev . . .	0.3
Stockholm . .	0.3	Riga . . .	0.3
Göteborg . .	0.2	Bucharest . .	0.3
St. Petersburg .	1.7	Vienna . . .	2.1
Moscow . . .	1.4	Prague . . .	0.2
Warsaw . . .	0.8	Trieste . . .	0.2
Odessa . . .	0.4	Budapest . .	0.7
Lodz . . .	0.4	Zurich . . .	0.2

Towns.—**Vienna** is situated on the route to Constantinople from Paris and Western Europe, where that route is crossed by the route from the Baltic Sea to the head of the Adriatic Sea. It has always been an important city and is situated upon the Danube in the "basin of Vienna," consequently its population is large and it is the most important city in Europe outside the Western lands. (Fig. 98).

St. Petersburg and **Moscow**, the present and the old capitals of the Russian Empire, each contain over a million people. **Warsaw**, the largest town in the populous district of Western Russia, **Budapest**, the capital of Hungary, are large towns; the other towns

are small and in this respect Northern and Eastern Europe agrees with the Mediterranean lands in having small towns as the accompaniment of a distinctly agricultural population.

Christiania, Stockholm, Riga, Odessa and Trieste are ports.

SUMMARY.

1. Norway produces timber, and has a fishing industry.
2. Sweden produces timber, and mines and works iron.
3. Russia produces timber and grains.
4. Roumania and Hungary produce cereals.
5. Austria and Switzerland are mountainous and industrial.
6. Vienna is the largest city.
7. St. Petersburg and Moscow are great cities.
8. Riga, Odessa and Stockholm in the north and Trieste are ports.

QUESTIONS.

1. Write a short description of the region of the Alps. Name one German, one Italian, one French and one Austrian river that have their chief sources in the Alps. There is no coal in the Alps, how therefore does it happen that the Swiss are a manufacturing people? (Man.)
2. The steamers of the Blue Funnel line sail regularly from Liverpool and touch at Marseilles, Aden, Bombay, Singapore, Hong Kong, Victoria and Vancouver. Through what waters do they pass in going from Liverpool to Vancouver? (Man.)
3. What are the four principal articles of export from France. Explain why the countries to which they are sent need the commodities. (N.Z. Ed.D.)
4. What countries border the Mediterranean Sea? Write an account of the climate and vegetable products of this region. (U. Pan.)
5. Account for the commercial importance of Switzerland, Belgium, Denmark and Norway. (Auck. U.)
6. Draw a map of the Mediterranean and Black Seas, showing the boundaries and physical relief of bordering countries and chief seaport towns. Briefly describe Holland, Switzerland and Greece with respect to their physical features and industries. (U.A.)
7. Locate accurately and describe two coalfields on the continent of Europe? (C.P.)
8. Write a short account of either France or Germany under the following heads: (a) highland regions; (b) useful rivers; (c) most important towns. (C.P.)

58. The British Isles.

1. Record the facts about the climate of the British Isles given in Chapter 53.

2. Write a brief note on the facts about the work of the farmer in the British Isles from Chapter 54.

Position. The **British Isles** consist of two large and many small islands rising from a shelf of land which projects westwards from the continent of Europe: this shelf is the **continental shelf** (Fig. 90) and the British Archipelago consists therefore of **continental islands**. This archipelago lies nearly at the middle of the land hemisphere (Fig. 2).

Size and population.—The British Isles are about the same size as **Norway** and about half as large as either **France** or **Germany**. They contain a population of over **44 millions** which is largely concentrated into that part of England between lines drawn from **Newcastle** to **Carlisle** and from **Hull** to **Gloucester**. The average density of the population is greater than in any of the other states of Europe which are larger in size (p. 289), and the population in the North of England is as dense as anywhere else in the Western Europe.

Relief.—The south-east of Great Britain consists of lowland which forms an integral part of the great **European Plain**: while the remainder of the islands consists largely of upland between 1000 and 4000 feet in height. **Wales** and most of **Scotland** are upland, but across the narrowest part of Scotland lies the lowland of the **rift valley** which is incised by the three large estuaries of the **Firths of Clyde, Forth and Tay**.

South of this rift valley are the **Central Uplands of Britain** which are cut through by two gaps, those of the **Tyne** and the **Aire**.

Ireland consists of a central plain with uplands in nearly every direction between the plain and the sea. The continuation of this plain right up to the coast near **Dublin** has combined with the continuation of the English Lowland north-eastwards towards **Chester** to give historical importance to the city of Dublin, as the capital of Ireland.

Climate.—Being islands, the British Isles profit most of all the countries of Western Europe by the abnormal winter warmth of the North-east Atlantic Ocean (p. 25), and therefore the climate

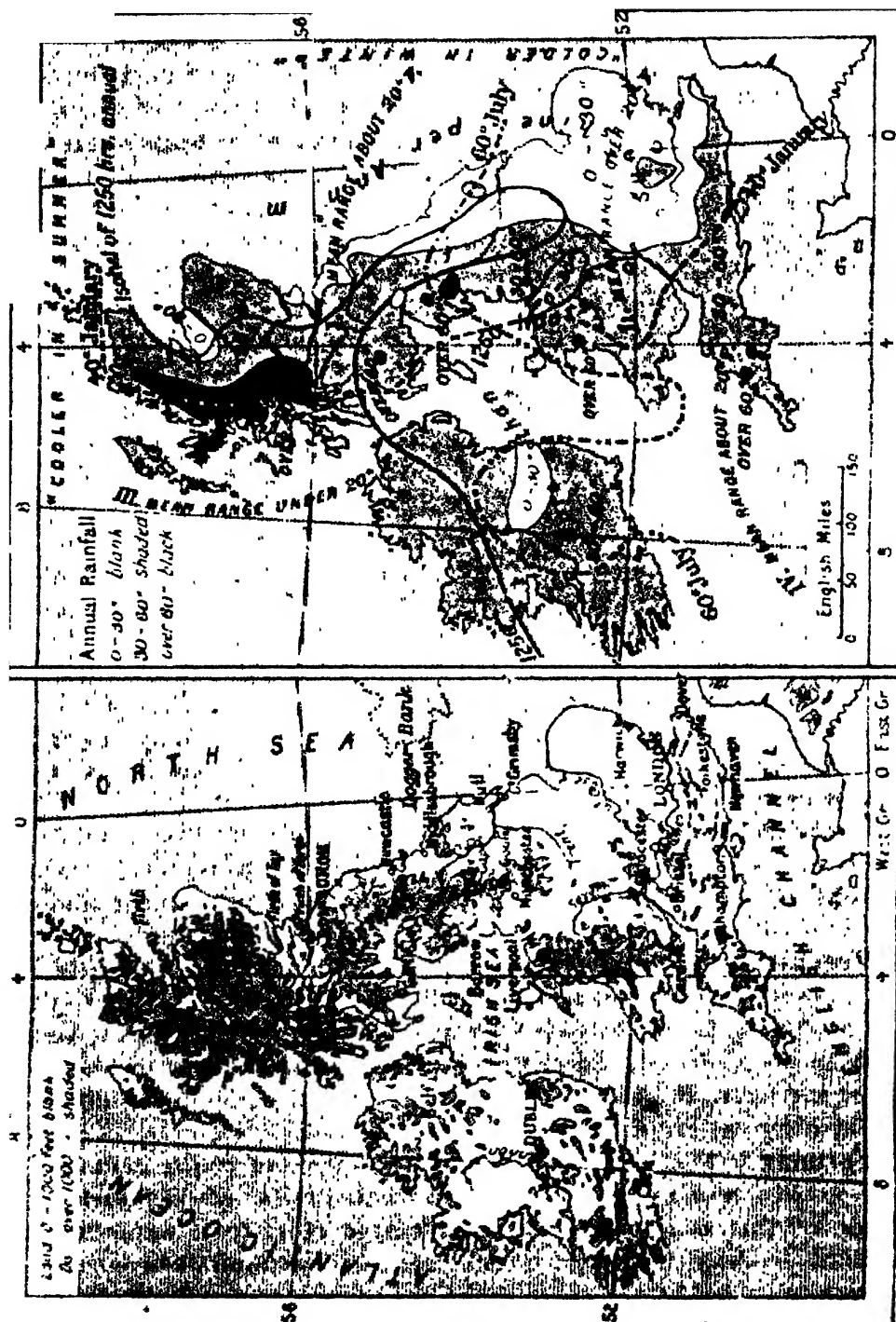


FIG. 99.—BRITISH ISLES: RELIEF.

FIG. 100.—BRITISH ISLES: CLIMATE.

Starford's Geog. Estab., London.

is more equable than in any other part of the globe in the same latitudes. The average January temperature is about 40°F. , and the average July temperature is about 60°F. The isotherms (Jan. 40°F. , July 60°F.), divide the islands into four parts, of which the south-east corner has the greatest **mean range* of temperature**, while the north-west has the least mean range. Since all the quadrants but that in the south-east are upland, the actual temperatures there experienced are at least three degrees colder than those shown by the isotherms wherever the land is higher than 1000 feet. Normally, temperature declines as the latitude increases, but in winter in the British Isles, as elsewhere in North-western Europe, increase in latitude is not the dominant factor in causing decline in temperature, which is due to distance from the warm surface drift waters of the neighbouring parts of the ocean.

A comparison of Figs. 99 and 100 shows that the heaviest rainfall tends to occur on the uplands, that is towards the west, and like New Zealand, the British Isles are wetter on the west than on the east, while the prevalent winds come from the ocean to the west and meet first the higher parts of both island kingdoms. The south of the islands are the sunniest regions, Fig. 100.

On the whole the climate of the British Isles is due to a contest between the **cyclonic storms** which follow the storm tracks of the North Atlantic Ocean (p. 299) and the calms which follow from the extension of the **high pressure** areas of either the continent of Europe or of the **Azores** westward or northward.

When the high pressures prevail the days are calm and bright, frosty in winter and hot in summer: when the storms cross the islands the days are wet and dull, rather cool in summer and rather warm in winter. • •

Vegetation.—Consequent upon the relief and the climate the vegetation of the British Isles tends to be that suited to a fairly wet temperate region, the lowlands are grass-covered, the uplands have trees or gorse, broom and heather. Much of the land is capable of some service to the farmer although wheat and barley are limited to the drier eastern districts.

Farming.—The United Kingdom grows about 2 per cent. of the world's **wheat** and about 5 per cent. of the world's **barley**. Most of this is grown in **Eastern England** (Fig. 101), where the rainfall is less than 30 inches per annum and where the

* Mean range of temperature here refers to the difference between the average temperatures of the coldest and hottest months.

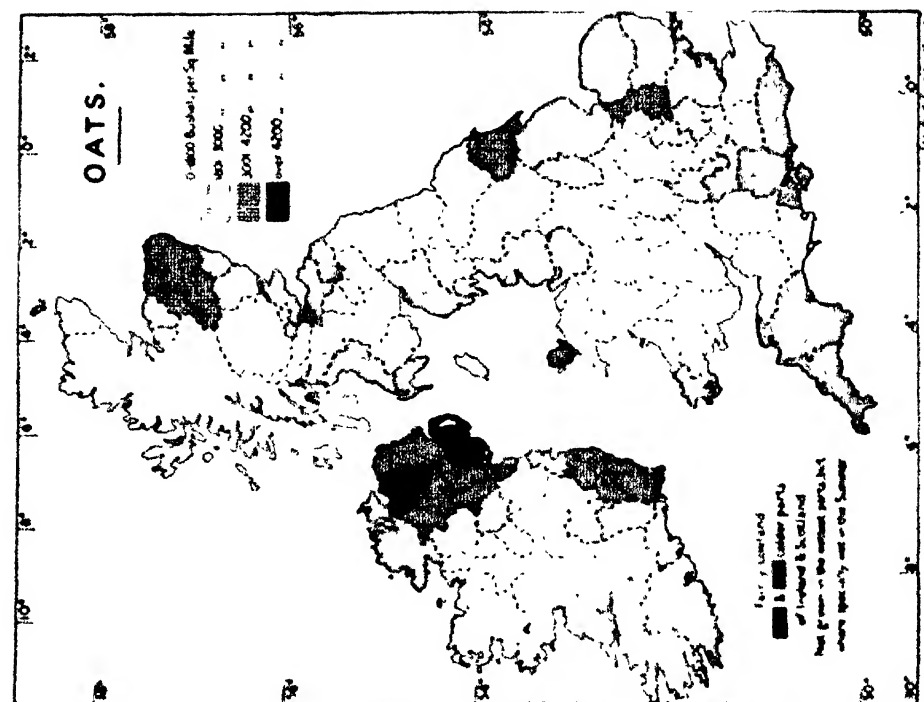


FIG. 102.—BRITISH ISLES: OATS.

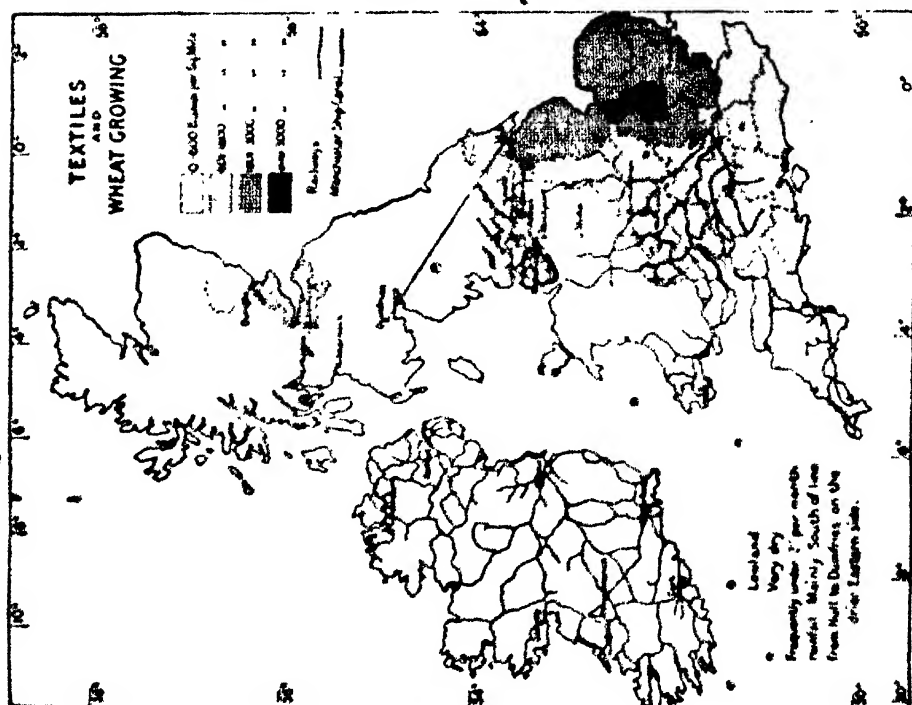


FIG. 101.—BRITISH ISLES: WHEAT.

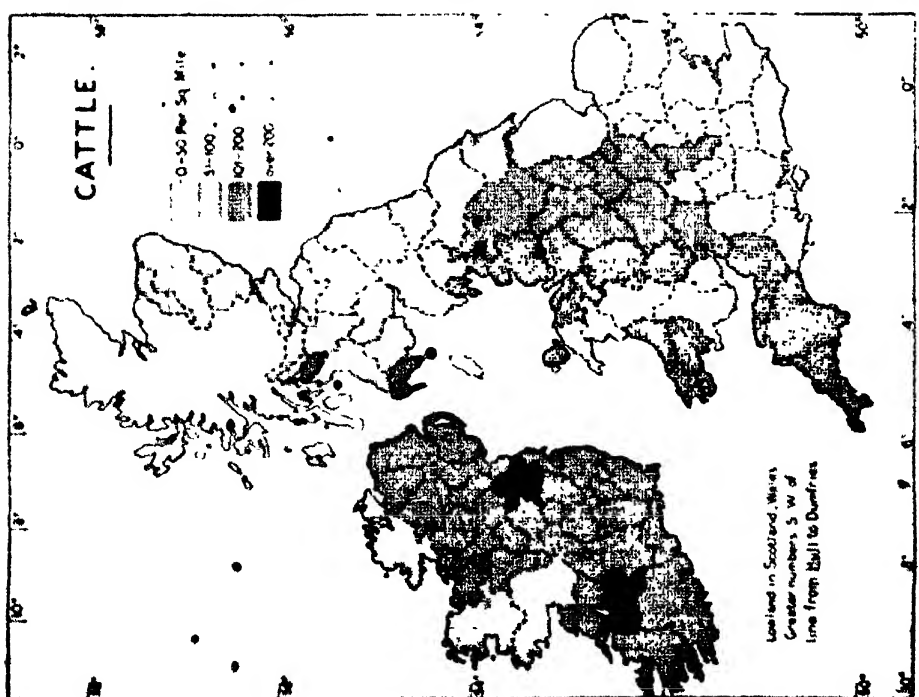


FIG. 103.—BRITISH ISLES: CATTLE.

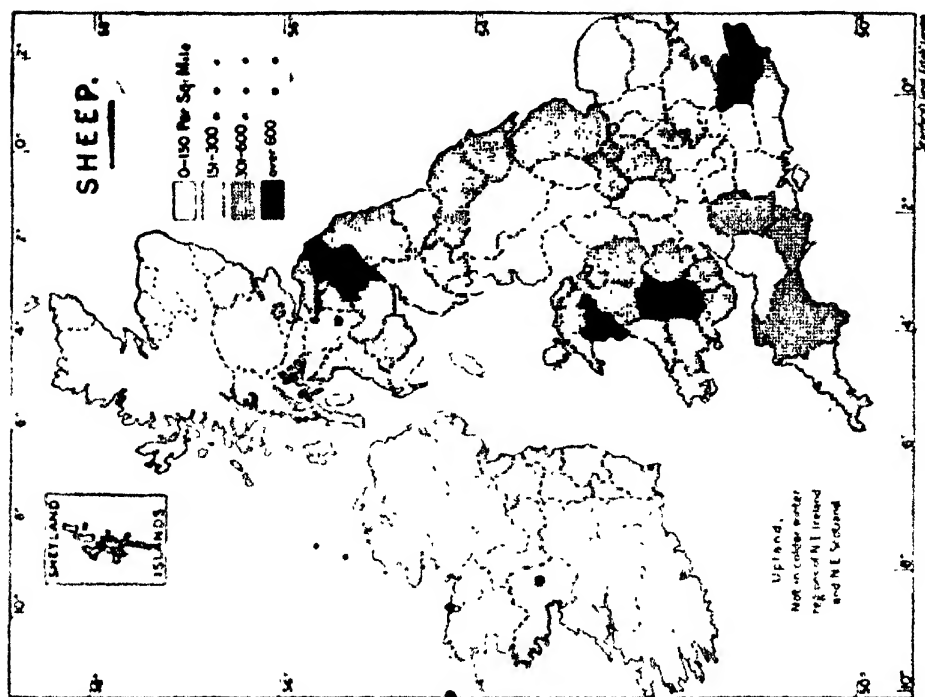


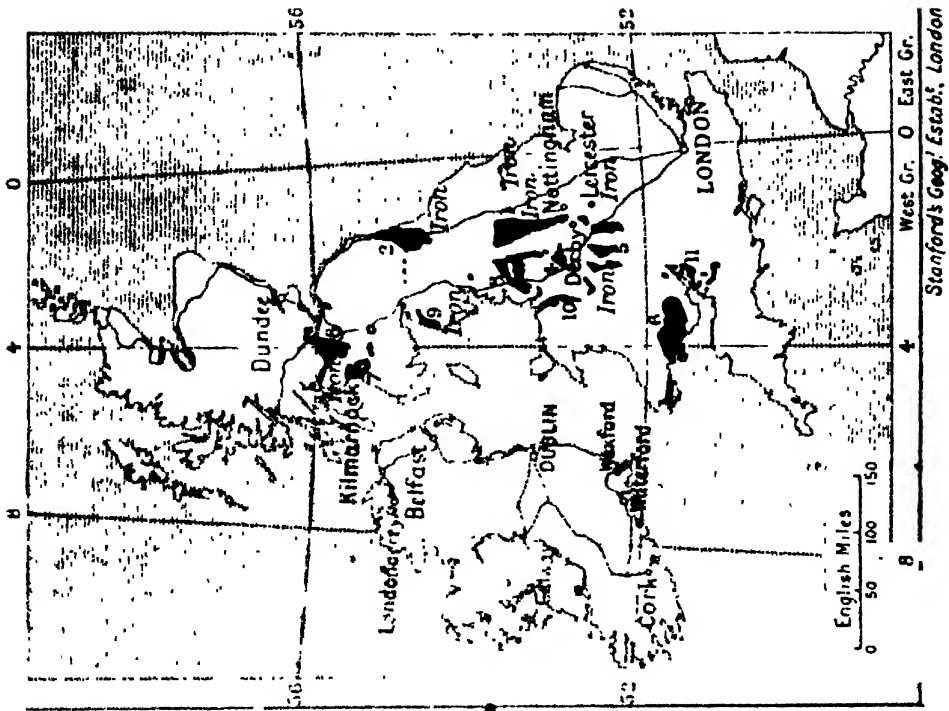
FIG. 104.—BRITISH ISLES: SHEEP.

average monthly temperature between the months of March and November, *i.e.* during the growing season, is never below 41° F. The chief districts for wheat are shown on Fig. 101, where the line from Hull to Dumfries marks the northern boundary of the area which has an average monthly temperature above 41° F. during the nine months from March to November. The other important crops are **oats** and **potatoes**, which are chiefly grown on the wetter western lands, as shown in Figs. 102, 105, which show the districts where the oats are grown to the extent of about 5 per cent. of the world's crop. Ireland is proportionately an important grower of oats and potatoes. Figs. 103 and 104 show the districts where **sheep** and **cattle** are reared. A comparison of these figures with Fig. 99 shows that on the whole the sheep are reared on the uplands and the cattle are reared on the wetter lowlands towards the west. The United Kingdom is proportionately the most important sheep-rearing country of Western Europe (p. 303) since about 5 per cent. of the world's sheep are reared, while the number of cattle is slightly greater in proportion than that of Germany, the United Kingdom rearing about 3 per cent. of the world's cattle.

TRADE IN WHEAT OF UNITED KINGDOM.

	Million Cwts.	Percentage.	
Home Production, -	30	21	$\frac{1}{5}$
Imports from			
United States, -	38	27	$\frac{1}{4}$
Argentina, -	24	17	$\frac{1}{5}$
British Empire, -	33	23	$\frac{1}{4}$
Rest of World, -	17	12	$\frac{1}{8}$
Total, -	142	100	1

The British farmer does not supply enough of any farm commodity for the consumption of the people of Britain and thus supplies have to be imported, as shown by the tables on pp. 307 and 308. Of each pound of wheat consumed in the United Kingdom, a quarter comes from the **United States**, a quarter is supplied by the **British Empire**; three ounces are home produce and three ounces come from **Argentina**. The **United States**, **Russia**, and the **Argentine**



Stanford's Geog. Estab., London

FIG. 106.—BRITISH ISLES: COAL AND IRON.
For explanation of numbers on the map, see p. 335.)

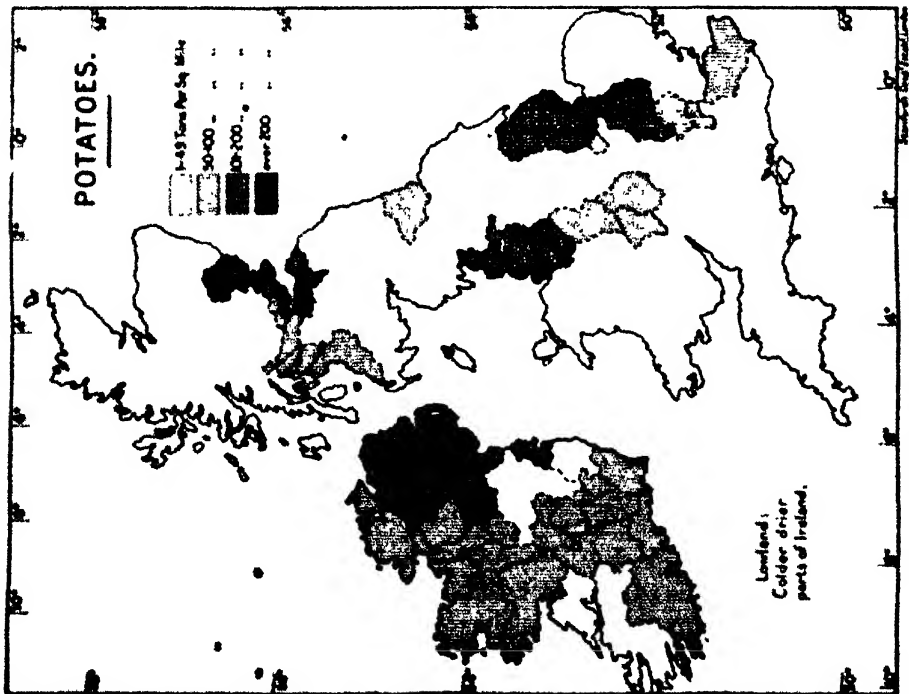


FIG. 105.—BRITISH ISLES: POTATOES.

send large supplies of cereals, while **New Zealand**, the **United States** and **Argentina** send large supplies of meat.

SUMMARY.

1. The British Isles are continental islands in Western Europe.
2. The United Kingdom of Great Britain and Ireland contains a dense population, especially in the North of England.
3. The climate of the British Isles is equable and is characterised by abnormal winter warmth.
4. Eastern England grows wheat and barley.
5. The British Isles grow oats and potatoes, rear sheep and cattle.
6. The people of the British Isles consume large quantities of food stuffs - cereals and meat - imported from abroad.

59. The British Isles (Continued)

1. Revise the facts about coal mining in Britain from Chapter 15.
2. Revise your record book to find out the countries which send cotton and raw wool to the United Kingdom.
3. Revise the tables of trade (for pages see Index) to find other commodities which are sent to the United Kingdom; tabulate the facts you find.
4. Write a brief note stating the way by which you would travel if you had to start for London to-morrow.

Mining and metal working.—The United Kingdom mines about 25 per cent. of the world's **coal**, and produces about 13 per cent. of the **iron ore**, about 19 per cent. of the **pig-iron** and about 13 per cent. of the world's **steel**. Germany, Belgium and the United States are the only countries which have a proportionately large production (p. 62). The coal and iron are mined in the districts marked on the map, Fig. 106, and the coal mining districts are shown in the following table.

The coalfields lie in the densely populated area of **North England**, in **Glamorganshire** in Wales and in the **Scottish rift valley**. Roughly speaking, a million workers are needed to produce about 250 million tons of coal a year, which means that the coal workers

obtain about a ton of coal each per working day: whereas in India one-tenth the number of workers produce about one-twenty-fifth of the coal, so that the miner in the United Kingdom produces about $2\frac{1}{2}$ times as much coal as the miner in India (p. 184).

COAL MINING IN THE UNITED KINGDOM.

County	District on Map.	Workers in thousands.	Coal produced annually in million tons.
Yorkshire	1	150	36
Derby	1	56	17
Nottingham	1	38	11
Durham	2	147	41
Northumberland	2	54	14
Lancashire	3	103	24
Staffordshire	4, 5	55	14
Warwickshire	5	15	4
Monmouth	6	51	13
Glamorgan	6	140	34
Ayr	7	14	4
Fife	8	20	8
Lanark	8	55	17
Stirling	8	10	3
Others	9, 10, 11	99	23
Total		1013	263

Roughly, 2 per cent. of the population are coal workers, and this means that about one-tenth of the people are dependant upon coal mining.

Iron occurs in North Lancashire near **Barrow**, and in North Yorkshire in the **Cleveland** district, and in conjunction with coal in the districts 1, 3 and 8. Consequently, there are many workers in iron in **Barrow**, in **Middlesborough**, in **Sheffield** and **Birmingham**, and in **Glasgow**. Barrow and Middlesborough draw coal supplies from the neighbouring coalfields.

On the coalfield of South Wales (Glamorgan) there is much work in connection with tin and copper.

Manufacturing.—Roughly, as many people in the United Kingdom are textile workers as coal workers: but the coal workers are nearly all men and boys while many women and girls work

at textiles. The table below gives the number of workers in the textile works in the chief districts.

TEXTILE WORKERS IN THE UNITED KINGDOM.

COTTON.		WOOL.		SILKS.		FLAX.	
District.	Workers in thousands.	District.	Workers in thousands.	District.	Workers in thousands.	District.	Workers in thousands.
Blackburn	142	Bradford	86	Bradford	6	Belfast	61
Manchester	113	Huddersfield	57	Stockport	5	Dundee	20
Oldham	77	Haltax	25	Haltax	3		
Bolton	47	Leeds	21	Stoke	3		
Stockport	46	Edinburgh	11	Birmingham	2		
Preston	38	Worcester	8	London	2		
Rochdale	35	Rochdale	8				
Glasgow	25	Glasgow	6				
Haltax	18	Dundee	5				
Bradford	12	Kilmarnock	5				
Others	24	Others	29	Others	8	Others	19
Total	577	Total	261	Total	29	Total	100

HOSEIERY.

Leicester, 19 ; Nottingham, 7 ; Derby, 4 ; others, 10. Total, 40.

LACE.

Nottingham, 7 ; Derby, 8 ; Kilmarnock, 4 ; others, 2. Total, 21.

On the whole these districts lie near one or other of the coal-fields. Compare Figs. 101 and 106. The cotton towns lie on or near the coalfield of **South-east Lancashire** (No. 3), they contain about half the textile workers, and are grouped round **Manchester** as a centre. Since the cotton fibre is entirely imported largely from the United States and Egypt by way of Liverpool (p. 345), and since iron is mined and worked on this coalfield, South-east Lancashire affords an illustration of the fact that the presence of coal and iron in proximity may localise a gigantic industry ; but the mere presence of coal and iron together is insufficient in itself to cause so gigantic an industry as the cotton work of South-east Lancashire to be confined in one small area. There must be other

factors which have caused this coalfield to have this industry in preference to other coalfields, such, for example, as that of Glamorgan, and the cause is found in the peculiar **dampness of the atmosphere** in South-east Lancashire, which gives that district world pre-eminence in the working of cotton, and this dampness is one of the chief consequences of the storm-tracks and surface drift of the North-east Atlantic Ocean. (Fig. 101).

The manufacture of **woollen and worsted** goods, carpets, etc., is not so strongly localised in one district, although all the woollen towns are on or near a coalfield: the majority being grouped round **Bradford** in the **West Riding of Yorkshire** (No. 1), while the woollen towns are also largely responsible for the manufacture of lace and hosiery.

Silk goods are made on the coalfields, while **linen** goods have become localised at **Belfast** and **Dundee** away from coal, because these districts are close to flax-growing regions; Belfast is near to that of North-east Ireland, and Dundee is comparatively near those of Russia and Belgium.

Most of the flax of Russia is grown in the basins of the **Volga**, **Danube** and **Dnieper** near **Orel**, **Koorak** and **Smolensk**: it is exported chiefly from **Königsberg** in Germany on the Baltic Sea. The **Belgian** flax is chiefly grown in the valley of the **Lys**.

Communications.—No part of the United Kingdom is more than 70 miles from the sea, hence communication and traffic by sea is easy from one part of the country to another.

Since London lies in the south-east corner of the country, near the continent of Europe, and is the seat of Government, the majority of the railway lines concentrate upon London. Fig. 106 shows the railway lines which pass from London by the east and west coast routes of Scotland, and the Great Eastern Railway. Fig. 101 shows the convergence of other main railway lines upon London, from the grazing and manufacturing districts of the west and from the manufacturing district of the north. Fig. 101 shows also the one great network of railway lines which join the woollen and cotton towns; this is the chief line which does not run to London, although it has railway connections with the metropolis.

Since the United Kingdom is insular and lies near the middle of the land hemisphere there arises a facility of sea communication which allows British ships to traverse every sea, and causes the British flag to fly in every port on the globe.

Trade.—The United Kingdom has millions of people who
 W.G. V

require food from overseas ; it has coal to sell and makes textile fabrics and iron goods which find a market all over the world ; moreover it is the Motherland of a mighty empire. All these factors combine to produce a gigantic world-wide trade, the details of which are given below.

The consequence of these facts lies in the decided contrast which exists between the trade of the United Kingdom and that of the United States.

UNITED KINGDOM TRADE* (SIX PRINCIPAL COUNTRIES)

Country.	Value in £1 ⁰⁰⁰ <i>£</i>	ARTICLES (Percentages).
From United States	124	Cottons (39), meat (17), cereals (13).
To ,,	48	Linens (7), cottons (9), iron goods (7), tin (8).
From Germany	36	Sugar (30), woollen goods (3).
To ,,	46	Wool and woollens (23), cottons (13), coal (6), iron goods (9).
From France	52	Silk and silks (16), wool and woollens (13), motor cars (5).
To ,,	28	Coal (17), wool and woollens (16).
From Holland	36	Sugar (6), iron goods (5), butter (3).
To ,,	16	Cottons (18), iron goods (10).
From Belgium	28	Iron goods (8), wool and woollens (8), flax (4).
To ,,	16	Cottons (16), iron goods (5).
From Russia	31	Cereals (32), timber (22).
To ,,	17	Coal (10), iron goods (13), raw cotton (13).
From World	615	
To ,,	478	

* Compare this table with that on p. 267.

The total trade amounts to over one thousand million pounds sterling annually, and of this the largest single share is with the **United States**, about 16 per cent. ; then come **France** and **Germany** each about 8 per cent., with the neighbouring countries of **Russia**, **Holland** and **Belgium** to follow. The above table shows that in all cases about one-third of the trade between the United Kingdom and these other countries is in about three groups of articles in each case, the exports are usually **coal** or **textiles**, the imports **food-stuffs** or **raw materials**.

GULF OF MEXICO TRADE WITH THE UNITED KINGDOM.*

Country.	Total U.K. trade in £10 ⁰⁰ .	CHIEF ARTICLES.		U.K. Port for the trade in these Articles.
		Sent to U.K.	Sent from U.K.	
Costa Rica	11	Coffee, bananas	Cottons, iron goods	Coffee to London ($\frac{2}{3}$)
Guatemala	5	Coffee	Cottons	Rubber to Liverpool ($\frac{2}{3}$), London ($\frac{1}{3}$)
Honduras	3	Mahogany, logwood	Cottons	
Nicaragua	2	Coffee	Cottons	Cocoa to London ($\frac{2}{3}$), Liverpool ($\frac{1}{3}$), Southampton ($\frac{1}{3}$)
Panama	3	Coffee, rubber	Cottons, iron goods	
Salvador	4	Coffee	Cottons	Cotton goods from Liverpool ($\frac{7}{10}$)
Haiti and San Domingo	4	Sugar, logwood	Cottons	Iron goods from Liverpool ($\frac{1}{3}$), London ($\frac{1}{3}$), Glasgow ($\frac{1}{3}$)
Cuba	29	Molasses, mahogany	Cottons, iron goods, linens, rice	Linens from Liverpool ($\frac{2}{3}$)
Mexico	36	Copper, mahogany	Cottons, iron goods	
West Indies (British)	45	Cocoa, sugar, bananas	Cottons, iron goods	
Guiana	12	Sugar	Cottons, manure	
Colombia	13	Coffee	Cottons	
Venezuela	8	Guttapercha	Cottons	

* Compare this table with that on p. 268.

The table above shows that the United Kingdom receives from the lands near the **Gulf of Mexico** much the same class of commodities as are sent to the United States, and that with the exception of flour she sends the same manufactures of cotton and iron. The United States has in most cases the greater trade, especially with **Cuba** and **Mexico**; this illustrates the effect of proximity.

The chief British ports are **Liverpool** and **London**.

**PACIFIC AND INDIAN OCEAN TRADE WITH THE
UNITED KINGDOM.***

Country.	Total U. K. trade in £10 ⁶ .	CHIEF ARTICLES.		U. K. Port for the Trade in these Articles.
		Sent to U. K.	Sent from U. K.	
Chile -	11	Nitrate, cop- per, tin	Cottons, iron goods	Cocoa to London ($\frac{1}{2}$), Liverpool ($\frac{1}{2}$), South- ampton ($\frac{1}{2}$)
Ecuador -	1	Cocoa	Cottons	Tea to London ($\frac{1}{2}$)
Peru -	4	Sugar, wool, copper	Cottons, iron goods	Wheat to Liverpool ($\frac{1}{2}$), London ($\frac{1}{2}$), Hull ($\frac{1}{2}$)
Australia -	51	Wool, wheat, butter	Cottons, iron goods, wool- lens	Wool to London ($\frac{1}{2}$), Liverpool ($\frac{1}{2}$)
New Zealand	22	Wool, mut- ton, butter	Cottons, iron goods, wool- lens	Rice to London ($\frac{1}{2}$), Liverpool ($\frac{1}{2}$)
Straits Settlements	11	Tin	Cottons	Butter to London ($\frac{1}{2}$), Hull ($\frac{1}{2}$), Leith, New- castle. Silk to London ($\frac{1}{2}$)
Ceylon -	6	Tea	Cottons	Cottons from Liverpool ($\frac{1}{2}$)
Br. India -	84	Tea, wheat, jute, rice, cotton	Cottons, iron goods	Woollens from Liver- pool ($\frac{1}{2}$), London ($\frac{1}{2}$), Grimsby, Hull
Hong Kong -	4	Silk	Cottons	Iron goods from Liver- pool ($\frac{1}{2}$), Glasgow ($\frac{1}{2}$), London ($\frac{1}{2}$)
China -	14	Silk, tea	Cottons	
Japan -	13	Silk	Cottons, iron goods, wool- lens	
Java -	4	Sugar	Cottons	

* Compare this table with that on p. 269; note that the values here are in million pounds sterling, ten times as great as those on p. 269.

In the trade with lands on the **Pacific and Indian Oceans**, the United Kingdom has both a greater volume and a greater variety than the United States, with the single exception of the trade with **Japan**. The United Kingdom receives **meat, cereals, tea, cocoa, sugar, wool, silk, tin, copper** and **nitrates** in exchange for **cottons, woollens** and **iron goods**.

The chief British ports are **London** and **Liverpool**.

South Atlantic lands trade more with the United Kingdom than with the United States and send **wool, meat, cereals** and **timber** to the United Kingdom as well as **rubber, feathers** and **coffee** to both countries, while they receive **coal** and **textiles** from the United Kingdom which form a different class of commodities from those received from the United States (p. 270).

The chief British ports are **London** and **Liverpool**.

SOUTH ATLANTIC TRADE WITH THE UNITED KINGDOM.*

Country.	Total U.K. trade in £1000.	CHIEF ARTICLES.		U.K. Port for the Trade in these Articles.
		Sent to U.K.	Sent from U.K.	
Brazil	10	Rubber	Cottons, coal	Rubber to Liverpool ($\frac{1}{2}$), London ($\frac{1}{2}$)
Argentina	42	Wheat, maize, beef, mutton, wool	Cottons, coal, iron goods, woollens	Wheat to Liverpool ($\frac{1}{2}$), London ($\frac{1}{2}$), Hull ($\frac{1}{2}$)
Uruguay	3	Wool, meat	Cottons, coal, woollens	Wool to London ($\frac{1}{2}$), Liverpool ($\frac{1}{2}$)
British Africa South	16	Wool, feathers	Apparel, iron goods	Beef to Liverpool ($\frac{1}{2}$), London ($\frac{1}{2}$), Southampton. Mutton to London ($\frac{1}{2}$), Liverpool ($\frac{1}{2}$). Palm oil to Liverpool ($\frac{1}{2}$).
West	6	Rubber, mahogany, palm oil, copra	Cottons, iron goods	Coal from Cardiff ($\frac{1}{2}$), Newcastle ($\frac{1}{2}$). Cottons from Liverpool ($\frac{1}{2}$)
French West Africa	1	Rubber	Cottons	Iron goods from Liverpool ($\frac{1}{2}$), Glasgow ($\frac{1}{2}$), London ($\frac{1}{2}$)

* Compare this table with that on p. 270; note that the values here are in million pounds sterling, ten times as great as those on p. 270.

Mediterranean lands send typical Mediterranean products, **currants, lemons, oranges, olive oil** in addition to **cotton** from Egypt, **cork** from the Iberian peninsula, and **cereals**. The United Kingdom sends in exchange chiefly **coal** and **cotton goods**.

The chief British ports are **London** and **Liverpool**.

MEDITERRANEAN AND BLACK SEA TRADE WITH THE UNITED KINGDOM.

Country.	Total U.K. trade in £1000	CHIEF ARTICLES		U.K. Port for the Trade in these Articles.
		Sent to U.K.	Sent from U.K.	
Algeria -	1	Esparto fibre	Coal	Currants to London (½), Liverpool (½)
Egypt -	26	Raw cotton	Coal, cottons	Lemons to London (½), Liverpool (½)
Turkey -	13	Wool, fruits	Coal, cottons	Oranges to London (½), Liverpool (½)
Greece -	3	Currants, iron ore	Coal, cottons	Olive oil to London (½), Liverpool (½)
Italy -	14	Lemons, hemp, olive oil	Coal, iron goods	Wine to London (½)
Austria-Hungary	5	Grain, sugar	Ships, coal, cotton	Cork to London (½), Glasgow (½)
Spain*	20	Ores of copper, iron, lead, cork, oranges, onions	Coal, cottons, iron goods	Ships from Newcastle (½), Glasgow (½), Belfast (½), Barrow (½)
Portugal*	6	Cork, cocoa, wine	Coal, cottons, iron goods	
Roumania -	5	Grain	Cottons	
Bulgaria -	1	Grain	Cottons	

* Included here for convenience.

BALTIC SEA TRADE WITH THE UNITED KINGDOM.

Country.	Total U.K. trade in £1000	CHIEF ARTICLES		U.K. Port for the Trade in these Articles.
		Sent to U.K.	Sent from U.K.	
Russia -	48	(See tables, pp. 323-4)		Timber to London (½), Liverpool (½), Hull, Cardiff, Manchester, Glasgow
Sweden -	17	Butter, timber, paper, iron ore, and goods	Coal, textiles	Iron ore to Middlesborough (½), Glasgow, Cardiff
Norway -	10	Timber, paper	Coal, iron goods	Bacon to Liverpool (½), Harwich (½)
Denmark -	22	Butter, bacon, eggs	Coal	Flax to Belfast (½), Dundee (½)

The lands on the **Baltic Sea** send **food-stuffs** and **timber** products, including **paper**, in exchange for **coal** and **textiles**. In the case of this trade the nearness of the ports on the east coast to the Baltic Sea causes **Dundee**, **Harwich** and **Middlesborough** to compete with **London** and **Liverpool** in this trade.

Estimating the total trade of the United Kingdom at over £1000,000,000 per annum, the Baltic, South Atlantic and Mediterranean trade is roughly in each case one-tenth of the total, that of the Gulf of Mexico is about one-sixtieth, while that of the Pacific and Indian Oceans is about one-fifth of the total, which leaves about half the total trade of the United Kingdom with lands across the North Sea or the North Atlantic Ocean.

SUMMARY.

1. The United Kingdom mines coal, especially near the Central Uplands; and works iron, copper and tin on the coalfields.
2. Cotton goods are made in South-east Lancashire.
3. Woollen goods are made chiefly in the West Riding of Yorkshire.
4. Linen goods are made in the districts near Belfast and Dundee.
5. Most British railways terminate their main lines at London.
6. The trade of Britain is greater than that of the United States, except with the Gulf of Mexico.
7. Half the total trade of the United Kingdom is with the United States, Canada, France, Germany, Holland, Belgium and Denmark.

60. **British Isles** (*continued*).

1. Compare the entrepôt trade of London (p. 346), with that of Singapore (p. 203).

2. Estimate the distances by sea from the entrance to the English Channel—about halfway between Cork and Brest—to Liverpool and London respectively.

3. Write a brief note on London in comparison with New York.

UNITED KINGDOM PORTS: TRADE IN £10⁶.

	Imports.	Exports.	Re-exports.	Total.
London - - - -	201	71	45	317
Liverpool - - - -	149	131	21	301
Hull - - - -	37	22	5	64
Manchester - - - -	28	14	1	43
Glasgow - - - -	15	28	—	43
Southampton - - - -	19	14	4	37
Grimsby - - - -	11	15	—	26
Harwich - - - -	19	4	1	24
Leith - - - -	14	6	—	20
Newcastle - - - -	10	10	—	20
Cardiff - - - -	6	13	—	19
Goole - - - -	5	10	—	18
Bristol - - - -	14	3	—	16
Newhaven - - - -	12	3	1	16
Dover - - - -	9	3	2	14
Folkestone - - - -	10	1	1	12
Others - - - -	54	45	4	103
Total - - - -	615	393	85	1093

Great ports.—The fact that **London** and **Liverpool** are the ports most frequented by trading ships has become obvious by the consideration of the preceding tables, but the fact is emphasised by the examination of the succeeding tables which refer to the imports and exports of the United Kingdom.

UNITED KINGDOM IMPORTS.

Article.		Chiefly from : *	Ports of Arrival.
Cereals, 10 ⁶ cwt.	190	U.S.A., Argentine	London ($\frac{1}{2}$), Liverpool, Hull
Live cattle, 10 ³	472	U.S.A.	Liverpool ($\frac{1}{2}$), London ($\frac{1}{2}$)
Meat, 10 ⁶ cwt.	17	U.S.A., Argentine	Liverpool ($\frac{1}{2}$), London ($\frac{1}{2}$)
Butter, 10 ⁶ cwt.	1	Denmark, Russia, Australia	London ($\frac{1}{2}$), Hull, Grimsby
Cheese, 10 ⁶ cwt.	2	Canada	London ($\frac{1}{2}$)
Cocoa, 10 ⁶ lbs.	56	Br. W. Indies, Portugal	London ($\frac{2}{3}$), Liverpool ($\frac{1}{3}$)
Coffee, 10 ⁶ lbs.	109	Brazil	London ($\frac{2}{3}$)
Tea, 10 ⁶ lbs.	320	India, Ceylon	London ($\frac{1}{2}$)
Sugar, 10 ⁶ cwt.	43	Germany	London ($\frac{1}{2}$), Liverpool ($\frac{1}{2}$)
Raw silk, 10 ⁶ lbs.	1	China	London ($\frac{2}{3}$)
Raw wool, 10 ⁶ lbs.	702	Australia, New Zealand	London ($\frac{1}{2}$), Liverpool
Raw cotton, 10 ⁶ cwt.	10	U.S.A., Egypt	Liverpool ($\frac{2}{3}$), Manchester
Flax, 10 ³ tons	96	Russia, Belgium	Belfast ($\frac{1}{3}$), Dundee ($\frac{1}{3}$)
Hemp, 10 ³ tons	114	Philippine Is., India	London ($\frac{1}{11}$), Liverpool
Jute, 10 ³ tons	363	India	Dundee ($\frac{1}{2}$), London
Rubber, 10 ³ cwt.	650	Brazil, West Africa	Liverpool ($\frac{2}{3}$), London
Timber, $\frac{1}{2}$ 10 ⁶	26	Russia, Sweden, Norway	London ($\frac{1}{2}$), Liverpool, Hull
Iron ore, 10 ⁶ tons	7	Spain	Cardiff ($\frac{1}{2}$), Llanelli ($\frac{1}{2}$), Newport ($\frac{1}{16}$)
Iron, 10 ³ tons	473	Sweden, Belgium	Grimsby ($\frac{1}{2}$), Hull
Steel, 10 ³ tons	609	Belgium, U.S.A.	Newport ($\frac{1}{2}$), Manchester ($\frac{1}{2}$)
Copper, 10 ³ tons	269	Chile, Australia, U.S.A.	Liverpool ($\frac{1}{2}$), London
Tin, 10 ³ tons	67	Str. Settlements, Chile	London ($\frac{2}{3}$), Liverpool

* 25 per cent. or more comes from countries marked as **U.S.A.**

United Kingdom imports.—With regard to most of the imports it is possible to say that one country, the name of which is printed in thick type in the foregoing table, supplies at least a quarter of the total of each commodity which is imported into the United Kingdom. The above table of imports shows also that the United Kingdom requires mainly raw materials for manufacture and food-stuffs.

UNITED KINGDOM EXPORTS.

Article.		Chiefly to *	Port of Departure
Coal, 10 ⁶ tons	60	France, Germany, Italy	Cardiff ($\frac{1}{4}$), Newcastle ($\frac{1}{4}$)
Cottons, £10 ⁶	85	India, China	Liverpool ($\frac{2}{3}$)
Woollens, £10 ⁶	20	(General)	Liverpool ($\frac{2}{3}$), London ($\frac{1}{3}$)
Apparel, £10 ⁶	5	British Empire	London ($\frac{2}{3}$), Liverpool
Herrings, 10 ⁶ cwt.	8	Germany , Russia	Yarmouth, Leith
Machinery, £10 ⁶	31	India	(General)
Ships, £10 ⁶	7	(General)	Newcastle, Glasgow
Iron goods, £10 ⁶	41	(General)	Liverpool ($\frac{1}{3}$), Glasgow ($\frac{1}{3}$)

* 25 per cent. or more goes to countries marked as **India**.

United Kingdom exports. The exports from the United Kingdom are not so varied in their nature, nor are they mainly sent to one or two countries. Only in the cases of cotton goods, apparel and herrings is it possible to say that one area receives more than one-fourth of the export of a single commodity.

UNITED KINGDOM RE-EXPORTS.

Article.		Chiefly to	Port of Departure.
Wool, 10 ⁶ lbs.	302	Germany, France, U.S.A.	London ($\frac{1}{3}$)
Cocoa, 10 ⁶ lbs.	12	Germany, Holland, U.S.A.	London ($\frac{1}{3}$)
Coffee, 10 ⁶ lbs.	56	Germany, Holland	London ($\frac{1}{3}$)
Tea, 10 ⁶ lbs.	48	U.S.A., Russia	London ($\frac{2}{3}$)
Rice, 10 ⁶ lbs.	2	Cuba, Br. W. Indies	Liverpool ($\frac{2}{3}$), London ($\frac{1}{3}$)
Rubber, 10 ³ cwt.	346	U.S.A., Germany	Liverpool ($\frac{2}{3}$)

London entrepôt trade.—The position of London at the centre of the land hemisphere becomes of striking importance when we see the large amount of entrepôt trade of the port. * The following table shows clearly that large quantities of **wool, rubber and tea, coffee, and cocoa** are re-exported from the United Kingdom, mainly from London.

British ports. — The concentration of the overseas traffic of the United Kingdom, which has already been noted, is clearly shown by the above table. Almost 30 per cent. of the total trade is with **London**, and almost an equal quantity depends upon **Liverpool**. The remaining ports may be considered as **Hull**, **Grimsby** and **Goole**, together responsible for 10 per cent.; **Manchester** adding to the concentration of ships on the Mersey estuary, **Glasgow** in the north and **Bristol** and **Cardiff** in the south on the west coast, with **Leith** and **Newcastle** on the east coast. **Harwich**, **Newhaven**, **Dover** and **Folkestone** complete the list, and they may be regarded as outports of London; since their traffic is mainly with the continent and partakes of the nature of ferry traffic, they are sometimes called ferry towns. **Southampton** alone on the south coast is a port of importance.

The importance of **Manchester** as a port is due to the ship canal which has been constructed between that city and the estuary of the Mersey (Fig. 101).

London. As the seat of Government of the Motherland and of the Empire, as the nearest big city to the continent of Europe, as the premier port of the United Kingdom, and as the largest city in the world London is of supreme importance. Some distance inland from the open sea it stands at the lowest point on the river Thames which could be bridged, and consequently lies on both sides of that river, the two parts of the city being joined by many bridges and by under-river railways.

The concentration of business near the river and the docks has driven the population of over seven million people outwards towards the suburbs, with the result that many people spend an hour or so each day in travelling in each direction between home and business.

Fig. 107 shows the development of **underground railways**, called tubes, which serve part of this passenger traffic, but in addition there is a frequent and crowded **train** service from the suburbs to the city along the railways which are shown. But these railways do not suffice; there are further many lines of **trams**, and **omnibuses** through the principal streets, all of which are crowded in the morning and evening with people going to business or home again.

A chief reason for the importance of London lies in the fact that it is the seat of Government for the British Isles and the British Empire: hence the importance of the Houses of

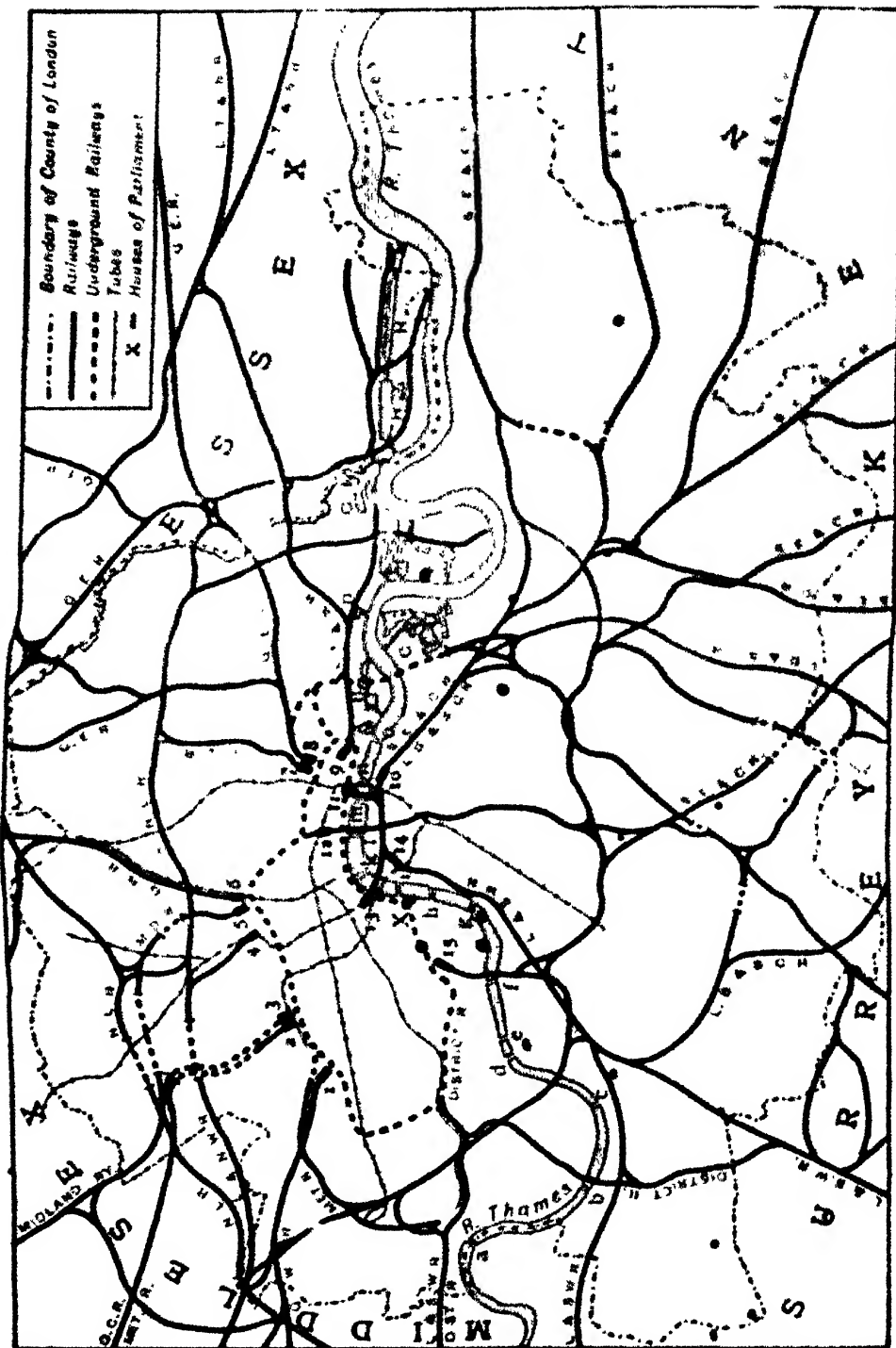


FIG. 107.—LONDON: COMMUNICATIONS.

Parliament (Fig. 108). In addition to the many men who do the work in the Government Offices there are in London the officials of the London County Council, the area of whose jurisdiction is shown in Fig. 107, the officials of the City of London and of the City of Westminster as well as those of the County of Middlesex.



FIG. 108.—THE HOUSES OF PARLIAMENT.

These officials form part of the crowds which daily fill the tubes, etc., but there are many more of these people connected with **commerce**, as their work lies in offices connected with the great trade of the port of London; many others are at work in connection with **finance**, as London is the greatest money market in the world; while many others are **manufacturers**, since London is the city in the world wherein the greatest variety of manufacturing is carried on. There is not one great industry as there is in Manchester or in Birmingham, but many industries, each of which vies in importance with the single industry which makes other towns famous.

TOWNS AND CITIES OF THE UNITED KINGDOM.

	Population in thousands	CHARACTERISTIC INDUSTRY.
Glasgow - - - -	872	Shipbuilding
Liverpool - - - -	760	Commerce
Manchester - - - -	655	Cotton manufacturing
.. (with Salford) -	807	
Birmingham - - -	564	Iron and steel working
Leeds - - - -	484	Woolly manufacturing
Sheffield - - - -	471	Iron and steel working
Bristol - - - -	378	Commerce
Edinburgh - - - -	355	Commerce
Belfast - - - -	340	Shipbuilding and linens
West Ham - - - -	321	(Part of Greater London)
Bradford - - - -	294	Woollen manufacturing
Dublin - - - -	291	Commerce
Newcastle - - - -	282	Iron and steel working
Hull - - - -	275	Commerce
Nottingham - - - -	263	Leather making
Leicester - - - -	244	Hosiery

Other cities. -- With the exception of the ports, and of **Edinburgh** and **Dublin**, the capital cities of Scotland and Ireland, the other great towns are chiefly concerned in one or other great industry, as shown in the above table. It will be noted that the majority of the sixteen towns in the table, which have each more than a quarter of a million inhabitants, lie within the northern part of England which is predominantly manufacturing. Consequently most of them lie on or near a coalfield.

SUMMARY.

1. London and Liverpool are by far the most important British ports.
2. The imports of the United Kingdom are food-stuffs and raw materials for manufacture from all over the world.
3. The exports of the United Kingdom are coal to the shore-lands of the Atlantic Ocean ; textile fabrics to all the world.
4. London receives and redistributes wool and tropical products.

5. London is the largest city in the world ; apart from its commerce, its finance, it has a multiplicity of manufactures.

6. The transport of Londoners from home to business has resulted in a highly organised system of surface and underground railways, and of street trams and omnibuses.

QUESTIONS.

1. What kinds of goods do we import from Canada, China, India and Australia respectively ? What class of commodities do we send them in return ? (L.C.U.)

2. Name the principal coalfields of England and Wales, with one or two of the most important towns on each, and any other industries carried on there. (L.C.U.)

3. Indicate (if possible, showing isothermal lands on a search map) the number, distribution of summer and winter temperatures in Great Britain. (N.U.)

4. Contrast the chief agricultural products of Ulster and East Anglia, and account for the more important differences. (N.U.)

5. Contrast the climates of the east and west coast lands of Great Britain, explaining any difference. (Newf.)

6. Give a general description of the climate of the British Isles, including the local differences as to temperature, moisture, etc. (U.A.)

7. Where are cotton goods made in the British Isles ? From what countries do we obtain raw supplies of cotton ? To which countries do we send cotton goods ? Why do we not grow cotton at home (England) ?

8. What are the principal food imports of the British Isles ? State where they respectively come from. (U.A.)

9. (a) Select any *one* coalfield in the British Isles. Show its position on a rough sketch map, together with the nearest iron-ore district, and three or four towns which have profited by the existence of the two "fields."

(b) How does the output of the United Kingdom compare with that of its great rivals, U.S.A. and Germany ? (L.U.)

10. Suppose I were to travel in a straight line from Lisbon to St. Petersburg, what countries would I traverse, what rivers and mountains would I cross, and what cities would I pass through or in the neighbourhood of ? (P.E.I.)

11. Show how physical features of Europe, the travelling winds and the ocean currents have contributed towards Great Britain's commercial and industrial importance. (Sask.)

12. Give three reasons for England's commercial supremacy. (Ont.)

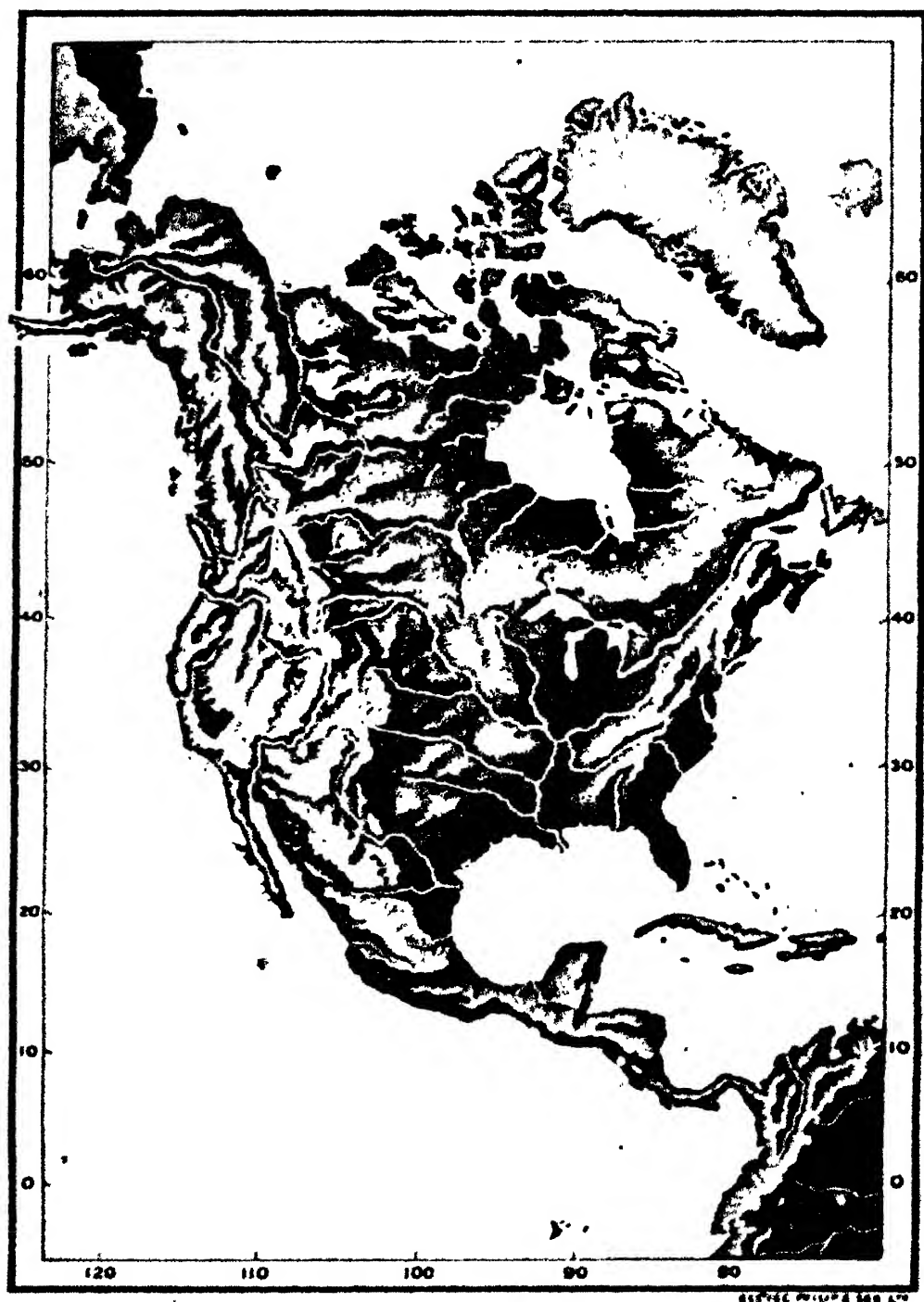


FIG. 109.—NORTH AMERICA: RELIEF.



FIG. 116.—EUROPE: RELIEF.

13. Describe fully a journey from Cairo to London, via Brindisi overland, and back to Cairo, via Marseilles. Mention towns, mountains, and production of districts through which you would pass.

14. Compare Great Britain and Japan under the following heads: Position, coast line, climate, mineral wealth and commerce.

15. Write a description of the position of London, and point out in what ways you consider geographical conditions have helped to make London important. (L. U.)

61. Europe and North America.

1. Compare the relief maps of Europe, Figs. 90 and 110. Note the ridges which arise from the high plateaus.

2. Compare Fig. 110 with Fig. 66. Note the gradual widening as it passes eastwards of the high plateau from Asia Minor.

3. Compare the high plateaus of Eurasia with those of North America. Fig. 109.

The Relief of Europe.—Fig. 110 shows on a larger scale the relief of Europe which is shown on the western side of Fig. 66. The essential connection between the lowland towards the Arctic Ocean, the mountainous plateaus of Southern Eurasia, is at once seen.

These mountainous plateaus have steep-sided edges, and frequently in Spain and Tibet have ridges rising from the middle of the plateau. The Trans-Himalaya is of this type. The great peoples of Europe, the British, the French, the Germans and the Russians inhabit the European part of this lowland.

For convenience of printing, the Atlantic Ocean is shown at the bottom of Fig. 109, but at the right hand side of Fig. 110, which should be compared with Fig. 109. North America resembles Europe in the lowland which stretches from the Gulf of Mexico northwards, which is like the lowland of Russia north of the Black Sea.

The North Atlantic Basin.—The North Atlantic Ocean is almost a closed sea, with one great entrance between Africa and South America, and two entrances by the Mediterranean Sea and by the Gulf of Mexico. At present the Suez Canal is open, while the Panama Canal on the American side is under construction.

Round the shores of this basin are the great industrial nations of the world, the United Kingdom, Germany, France and the United

States. Into this basin come the food-stuffs and the raw materials which are supplied by the rest of the world to meet the requirements of these nations, and out of this basin pass the manufactured products of these peoples for the use of the rest of the world. World traffic is concentrated on this expanse of water, which lies about the middle of the land hemisphere.

Stretching away eastward is the continent of Eurasia, and westwards lies the breadth of North America, and excepting the parts near the coasts these land masses have a great similarity.

Fig. 111 shows that from the high plateau region of the west of North America the traveller passes across middle and lower plateaus, then across high plains, and finally reaches Manitoba—the rolling prairie, where the lowland begins.

Fig. 112, which is on the same scale as Fig. 111, and is drawn so that half the world lies between the middle meridians of the two maps, shows that the traveller who passes westwards from the high plateau of Asia traverses lower plateau and then high plains to reach the steppe land of the south of Russia, which is the counterpart of the prairie. In both cases the traveller has to the south a larger area of high plateau, and in both cases the general slope of the land is downwards towards the Arctic Ocean.

In either case the traveller is frequently reminded of the scenery which he would find were he traversing the other continent. The land he traverses forms part of the depression round the North Pole which is partly filled by Arctic Ocean, and away on the edge there exists the high plateau of Greenland in America, paralleled by the plateau of Scandinavia in Europe. Both lands lead towards the North Atlantic Basin. Both lands are crossed by a great railway line, the Canadian Pacific on the west and the Trans-Siberian on the east, and in both cases the railway line has meant the development of Western Canada on the one hand and Siberia on the other: without the railway these lands would have remained backward and unproductive: as the development proceeds these lands will become more and more granaries for the increasing populations of the shore-lands of the North Atlantic.

The similarity has a further scope; the continental shelf of Newfoundland is paralleled by the continental shelf of the British Isles, and the Allegheny plateau has its parallel in the plateau of Iberia.

Eurasia is, however, somewhat different on the Pacific side.

America has no parallels to the lowlands of China and the peninsula of India, either physically or with reference to the teeming populations of these countries.

California represents a meagre counterpart of China, and perhaps Mexico may be considered as remotely resembling India, but the difference becomes of importance when we think of the traffic which passes away from the Atlantic Ocean by land. The American railway lines end at California, but the Eurasian lines

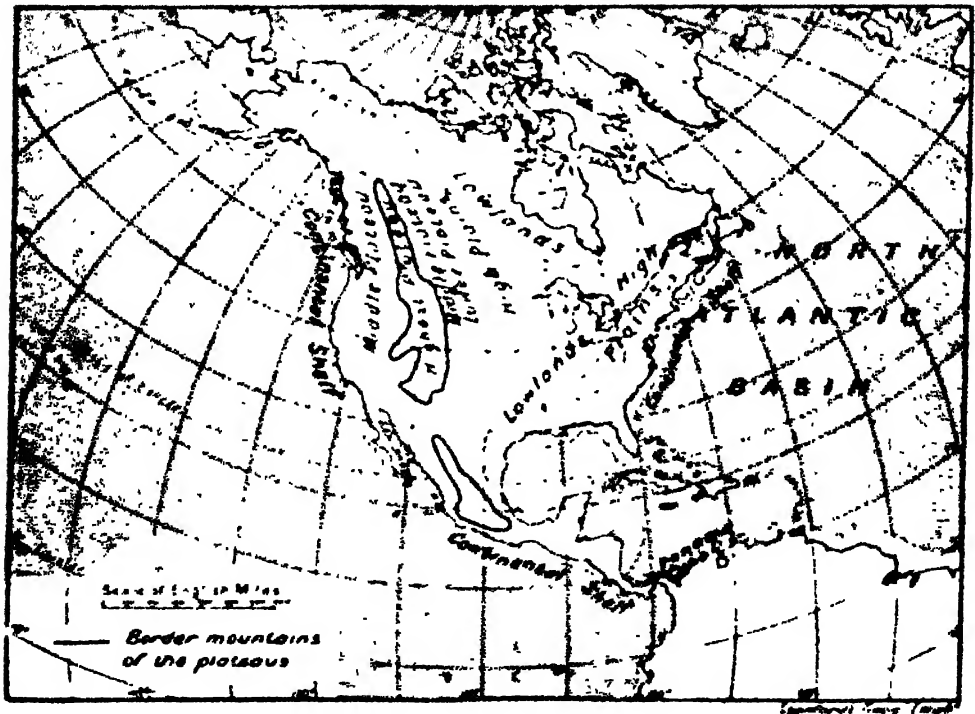


FIG. 113. - NORTH AMERICA.

which are shown in Fig. 113 tend to pass south-eastwards towards India. Eurasian railways Fig. 113 are not projected across the high plateaus of Central Asia, which are shown by the bare place on the map, but they are projected with the idea of joining the Indian and European railway lines.

The same tendency is to be noted in connection with the great canals; the Suez Canal has been open and in ever-increasing use for a long time, while the Panama Canal is not yet finished.

Apart from Australasia, the home of the white man is the lands of Eurasia and North America which surround the Polar Sea, and

are so similarly placed as regards the North Atlantic Ocean. He works for the world, his manufactures make progress in the rest of the world possible, his railway lines traverse the wide world his fabrics are worn in every clime, his ships sail every sea, the intellects of his race are responsible for the prosperity and peace of civilisation. Among the nations of white men the Briton takes a proud position ; his heritage it is to lead the way in this progression, the stability and progress of the British Empire

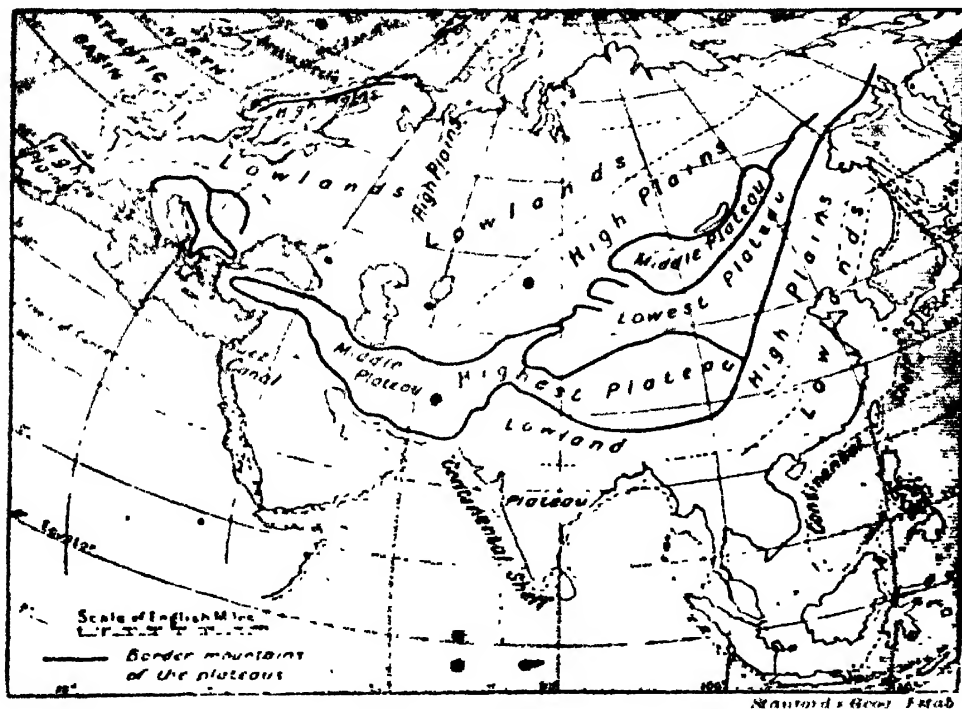
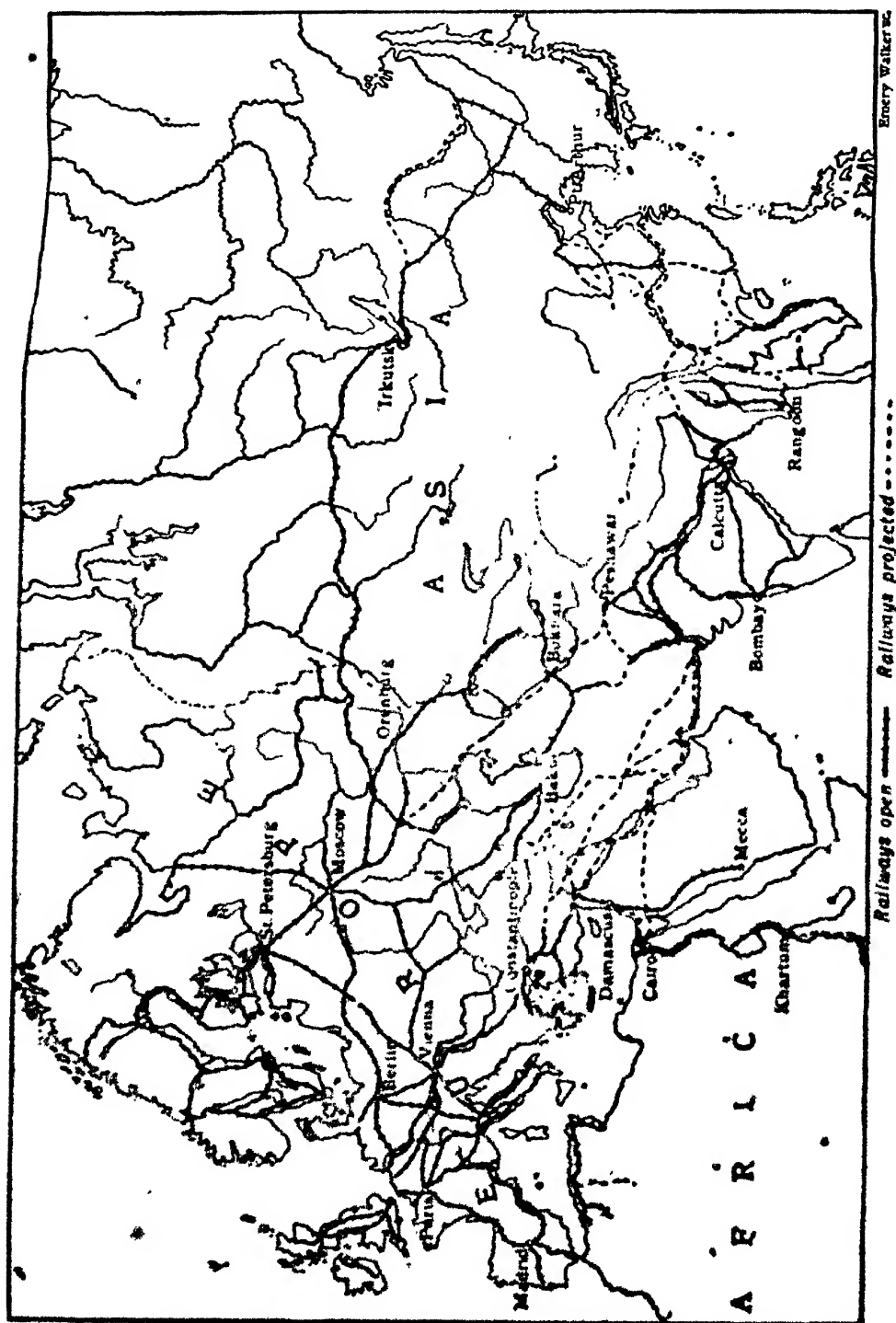


FIG. 112 -- EURASIA.

which are measured in these pages represent his monument. It is fitting, therefore, that the future citizens of the Empire, on whom rests the burden of the maintenance of this stability and progress, should know as accurately as is possible the foundations on which these things have been reared. Trade follows the flag ; not a petty local trade seeking to serve its own selfish ends, but seeking the best from others and giving the best in return, linking up the world with bonds which tend to bind all men together and tend to make our Empire a lasting monument to the virtues of painstaking endeavour and ceaseless activity.



Emory Walker

FIG. 113.—EURASIAN RAILWAYS

QUESTIONS.

1. On a map of the world shade the principal cotton growing localities with vertical lines, their markets with horizontal lines, and mark the main routes between the producing and manufacturing countries. Name the chief manufacturing centres in each consuming country. (U.A.)

2. Name the chief fishing centres of the world. (U.A.)

3. Give a general comparison of Eurasia and North America under the headings : structure, drainage, coast line, and productive districts. (Alb.)

4. Locate, and state with some fullness the importance of each of the following : Pittsburg, Sheffield, New Orleans, Liverpool, Belfast, Marseilles, Havre, San Francisco, Odessa, and Tokio. (Alb.)

5. Give a geographical account of an overland journey (including Paris if necessary) from Antwerp to Calcutta. Describe briefly the main surface features and the industries obtaining in the areas traversed. (U.S.)

6. In the map of Europe mark the route by steamer and rail from London to Brindisi, London to Constantinople, and London to St. Petersburg, naming the ports and ~~two~~ other towns on each route. Mark the iron district of Sweden, the wine districts of France, the coalfields of Germany, and the goldfields of Russia. (C.W.B.)

7. State and account for the distribution of iron industries in England and Wales, discussing the conditions which specially affect them in each of the different areas concerned. (L.U.)

8. A certain place shows the following average monthly temperature and rainfall figures.

TEMPERATURE.

80, 79, 80, 80, 80, 81, 81-81, 81, 82-81 F.

RAINFALL.

8, 11½, 12½, 13, 9, 5½, 3, 3½, 2, 1½, 3, 4 inches.

(a) Convert the figures into diagram form.

(b) What do you consider the striking features of the figures?

(c) What can you gather from your diagram as (i) locality of the place, and (ii) its probable industries? (L.U.)

9. Answer any four (not more) of the following questions. How is it that :

(a) The Norwegians have become a nation of shipbuilders and traders?

(b) Clocks in Galway are more than half an hour slow by Greenwich time?

(c) Cornish mining is not as important as it used to be?

(d) Belgium has become a great manufacturing country?

(e) Date palms are found in the Sahara?

(f) Forecasts of weather can be made? (L.U.)

10. The following figures give the mean monthly temperature and rainfall for two places A and B. State to what part of the world each may belong and give reasons.

	A (altitude 750 ft.)		B (under 100 feet).	
	Temperature F.	Rain in.	Temperature F.	Rain in.
January - -	- 3.8	0.83	52.2	4.1
February - -	- 1.5	0.93	52.5	3.1
March - - -	14.9	1.07	54.9	3.7
April - - -	38.9	1.55	59.2	2.6
May - - - -	51.7	2.31	65.0	1.1
June - - - -	62.0	3.43	71.2	0.5
July - - - -	65.8	3.03	76.5	0.2
August - - -	62.7	2.55	77.0	0.6
September -	53.7	2.11	73.8	2.0
October - -	40.9	1.61	67.1	3.8
November -	21.0	1.00	59.4	4.0
December -	5.4	0.92	54.0	3.8

(C.S.C.)

11. Write a note on Scotland, its physical features, chief cities and industries. (Newfoundland.)

12. In what countries are wheat, wine, tea, cotton, and rice produced? What geographical explanation can you give of production in the localities you enumerate? (P.U.)

13. From what parts of the world are the following products obtained: coffee, sugar, rice, india-rubber, tobacco, olive oil? State the nature of any three of these products, and say briefly how they are obtained.

(N.Z. Ed.D.)

14. Between what places in Europe on the one side and South and Central America (including the Gulf of Mexico) on the other is an extensive trade carried on across the Atlantic? Say what you know of the nature of this trade.

(N.Z. Ed.D.)

15. "Great cities stand on great rivers." Is this true? and, if so, to what extent? Illustrate your answer by examples.

16. What conditions are necessary to constitute a great manufacturing country? Mention the four greatest manufacturing countries of the world, and show how far these conditions obtain in each.

17. Where are the chief coalfields of Europe? Name the principal towns which have grown up on them.

(L.C.Com.)

18. Describe the chief manufacturing centres of France, Belgium, and Germany, with their respective industries. (N.U.T.)

19. Describe the course of the river Rhine, naming its chief tributaries and the chief towns on its banks. (C.S.C.)

20. Describe the differences in the character of the vegetation on the lands lying along the eastern margin and along the western margin of the Atlantic Ocean between the tropic of Cancer and the Arctic circle. (C.P.)

21. Describe three available routes from London to Peking, and discuss their relative advantages. (C.P.)

22. Mention the chief parts of the British Empire to which the distance has been shortened by the construction of the Suez Canal, and name one port in each of the British possessions you mention. (S.A.)

23. What is meant by entrepôt trade? State the situation of four of the chief ports of the world having an exceptionally large trade of this nature, and point out in each case the circumstances favouring that trade. (S.A.)

24. What are the (a) existing and (b) possible sources of iron-ore for the use of British manufactures? (L.C.Com.)

25. Give two instances of regions abnormally dry, and of two exceedingly wet, on the earth. Explain the causes in two of these cases. (C.P.)

26. "Winds make the climate of a place."—What does this mean? How does it apply to Lancashire and Russia? (C.P.)

27. Some countries are very wet, others very dry. Give an instance of each, and explain the causes. (C.P.)

28. What are the chief causes influencing climate? Illustrate your answer by the varieties of climate in the British Isles. (C.P.), (L.C.C.)

29. In the British Isles winds from the west and south-west, as a rule, are warm and generally rain-bearing, and winds from the east and north-east are cold and generally dry. Account for these differences. Compare the characteristics of the prevailing winds of the British Isles with those of the United States of America and of India. (Eng.P.C.)

30. What causes determine rainfall? Why have some places more rain than others, and at a different time of the year? Give examples from any part of the British Isles or Europe. (C.P.)

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